

SUBJECT: MA-213 Model

DATE: July 1, 1931

TO ALL OFFICES:

We are releasing, herewith, an illustrated Machine Service Bulletin covering the MA-213 Model. This Bulletin includes the following:

The dismantling, assembling and adjusting of the mechanism.

Plates illustrating the parts and assemblies.

Repair parts and assemblies list.

All of these items are indexed so that any information desired may be located without difficulty.

IMPORTANT

It is most important and vitally necessary before any attempt is made to dismantle, assemble or adjust machines of this model, that the information contained in this Bulletin be thoroughly analyzed and understood, as this model must be dismantled, assembled and adjusted exactly as we have outlined, in order to obtain satisfactory results.

In most cases this Bulletin will reach the District Office before the receipt of a machine of this model; therefore, the District Manager should see that it is immediately placed into the hands of the servicemen so that no time will be lost in absorbing its contents, in order that they will be in a position to set up the machines when they arrive, and check the adjustments where necessary.

CAUTION

The carriages and the body of this model are packed separately in the shipping case. Under no circumstances should they be assembled and the machine operated without consulting the instructions outlined in Plates 66 and 66A.

Each District receiving this Bulletin is held responsible for it and we request its acknowledgment on the enclosed receipt card, which is to be returned to this office without delay.

FMS:GBC  
Enclosure

  
General Service Manager



## REAR CARRIAGE

NAME OF SECTION	DISMANTLING	ASSEMBLY AND ADJUSTMENT	REPAIR PARTS
	FROM MACHINE - PLATE 1	TO MACHINE PLATE 89-66-66A	
COVER CASE	PLATE 1	PLATE 9	PLATE 82
CHASSIS AND OPERATING <sup>LEVERS AND SHAFTS</sup>	" 2-66-A	" 7-66A	" 82-83
INTERMEDIATE DIAL GEARS	" 2-3	" 3	" 82-83
REGULAR TOTALIZER DIALS	" 3	" 3-4	" 82
TOTALIZER $\frac{1}{2}$ CENT DIAL	" 4	" 5	" 82
CLEAR FINGERS	" 6	" 6	" 82
CHECK PAWL	" 6	" 6	" 82
LOCK LATCHES	" 43	" 9-51-53	" 72
OILING - PLATE - 10			

## FRONT CARRIAGE

NAME OF SECTION	DISMANTLING	ASSEMBLY AND ADJUSTMENT	REPAIR PARTS
	FROM MACHINE PLATE 11	TO MACHINE PLATE 28-66	
COVER CASE	PLATE 11-12	PLATE 29	PLATE 79
CHASSIS	" 13	" 23-24	" 79
INTERMEDIATE DIAL GEARS	" 13	" 14	" 80
REGULAR REGISTERING DIALS	" 14	" 15	" 80
$\frac{1}{2}$ CENT REGISTERING DIAL	" 16	" 16-17	" 80
CLEAR FINGERS	" 18-22	" 18-22	" 79-80
CHECK PAWLS	" 19-22	" 19-22	" 80
PARTIAL STROKE LOCK	" 19	" 19	" 80
OPERATING LEVERS <sup>AND CLEAR OUT SHAFTS</sup>	" 20-21	" 25-26	" 81
COUNTING DIALS	" 22	" 22	" 80
CARRIAGE LOCKS	" 41	" 53	" 70
OILING - PLATE 27			

## BODY OF MACHINE

NAME OF SECTION	DISMANTLING	ADJUSTMENT AND ASSEMBLY	REPAIR PARTS
COVER CASE - PAN	PLATE 30-31	PLATE 65	PLATE 78
BAILS	" 41	" 61-62	" 75
SELECTING SHAFT (FRONT)	" 42-50	" 49-50	" 71
SELECTING SHAFT (REAR)	" 43-50	" 50-52-61	" 71
INTERMEDIATE GEAR SHAFT (FRONT)	" 43	" 49-52	" 69
INTERMEDIATE GEAR SHAFT (REAR)	" 42	" 49-52	" 70
CARRYING SHAFT (FRONT)	" 44	" 45-46-47-52-61	" 69
CARRYING SHAFT (REAR)	" 42	" 45-46-47-52-61	" 72
COUNTER SHAFT	" 43	" 47-48-65	" 74



## BODY OF MACHINE-CONTINUED

NAME OF SECTION	DISMANTLING	ASSEMBLY AND ADJUSTMENT	REPAIR PARTS
CARRIAGE LOCKS	PLATE 41-43	PLATE-51-53	PLATE-70-72
JACK SHAFT FOR <sup>COUNTING AND</sup> CARRYING FINGERS	" 43	" 51	" 75
SUPPORTS AND GUIDES	" 36-39-40	" 58-40	" 67-69-71-72
ZERO KEY MECHANISM	" 39	" 63	" 68
HAND CUT-OUT	" 39	" 63	" 77
JACK SHAFT (DRIVING)	" 40	" 54-55	" 77
SWITCHES	" 36-39	63-64	" 78
TIE RODS	" 36-39-42	" 52-58	" 68
COUNTING AND CARRYING FINGERS	" 43	" 51-65	" 76
JACK SHAFT CLUTCH AND COUNTERSHAFT	43-44	" 47-48-65	" 74

## KEYBOARD

NAME	DISMANTLING	ASSEMBLY AND ADJUSTMENT	REPAIR PARTS
KEYBOARD	PLATE 31-32-33	PLATE-63	PLATE-75-76

## SIDE FRAMES

NAME OF SECTION	DISMANTLING	ASSEMBLY AND ADJUSTMENT	REPAIR PARTS
SHIFT LEVERS	PLATE 34	PLATE 57	PLATE 74
REPEAT AND NON-REPEAT	" 34	" 56	" 73
GEAR TRAIN	" 35	" 57	" 73-74
HANDLE LOCATING ARMS.	" 35	" 48-54-65	" 71-74
PLUS AND MINUS BAR ASSEMBLY.	" 36	" 56	" 73
CARRIAGE LIFTER	" 36-39	" 57-60	" 68
OVERCARRY TRIP LEVER AND BELL	" 37-40	" 60	" 76-78
MACHINE LOCATOR ARM	" 37	" 59	" 77
QUICK STROKE LATCH	" 37	" 59	" 76
DOUBLE CLUTCH YOKE AND CLICK	" 37	" 60	" 77
CONNECTING LINK AND LOCK LEVER	" 38	" 59	" 76
CYCLE STOPPING ARM AND RELEASE	" 38	" 59	" 76
ROCKER SHAFT AND POSITIONER	" 38	" 56	" 73
PLANETARY DRIVE UNIT.	" 40	" 58	" 77
ADJUSTING BRACKET <sup>FOR FRONT</sup> CARRYING SHAFT.	" 39	" 59-61	" 69
MACHINE STOPPING LEVER <sup>AND</sup> GUIDE	" 38	" 59	" 76
MACHINE STOPPING LEVER, LATCH AND GUIDE	" 38	" 59	" 76
BELL TRIGGER AND HAMMER	" 42	" 52	" 70

## MOTOR UNIT

NAME	DISMANTLING	ASSEMBLY AND ADJUSTMENTS	REPAIR PARTS
MOTOR UNIT	PLATE-30	PLATE 64	PLATE-78

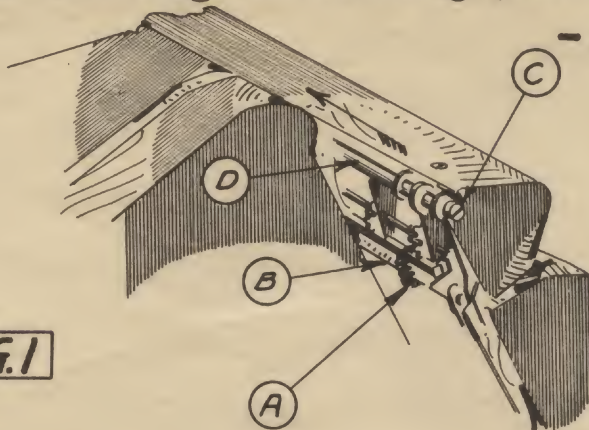


## DISMANTLING OPERATIONS REAR CARRIAGE.

- 1 UNHOOK SPRINGS (A) FROM LEDGE (B) (BOTH ENDS OF REAR CARRIAGE).

- SEE ALSO PLATE 66 A -

FIG.1



- 2 REMOVE HINGE ROD STUD (C) AND WITHDRAW HINGE ROD (D) IN DIRECTION OF ARROW.

(ASSEMBLE STUD IN ROD AND LAY ASIDE)

- 3 LIFT REAR CARRIAGE OFF MACHINE.

- 4 DECIMAL POINTER ROD (S) MAY BE REMOVED BY TAKING OUT SCREWS (Q).

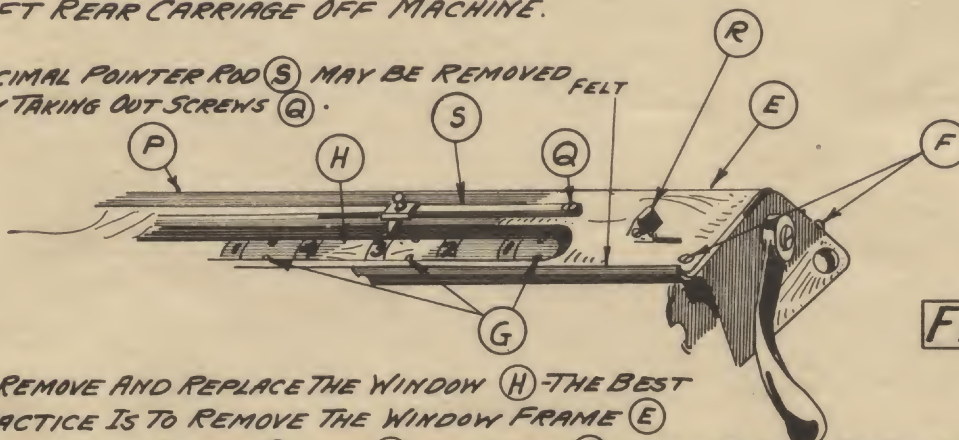


FIG.2

- 5 TO REMOVE AND REPLACE THE WINDOW (H) - THE BEST PRACTICE IS TO REMOVE THE WINDOW FRAME (E) BY REMOVING SCREWS (F) AND (M) AND KNOB (R) SHOWN BELOW. IF CLIP ENDS (J) ARE PRIED LOOSE, WINDOW MAY BE EXTRACTED FROM WINDOW FRAME - IF THIS IS DONE WHEN THE CARRIAGE IS ON THE MACHINE THE CLIPS MAY FALL INTO THE MACHINE AND CAUSE FUTURE TROUBLE WITH THE MECHANISM.

- 6 NOTE - TO MAKE REPAIRS ON CARRIAGE MECHANISM IT IS NOT NECESSARY TO REMOVE WINDOW FRAME (E) - THE CARRIAGE CASE MUST BE REMOVED AS BELOW.

- 7 REMOVE SCREW (J) AND PRY OFF HANDLE (K) - REMOVE KNOB (R).

- 8 REMOVE SCREWS (M) ONLY (OTHER SCREWS SHOWN ARE WINDOW FRAME SCREWS)

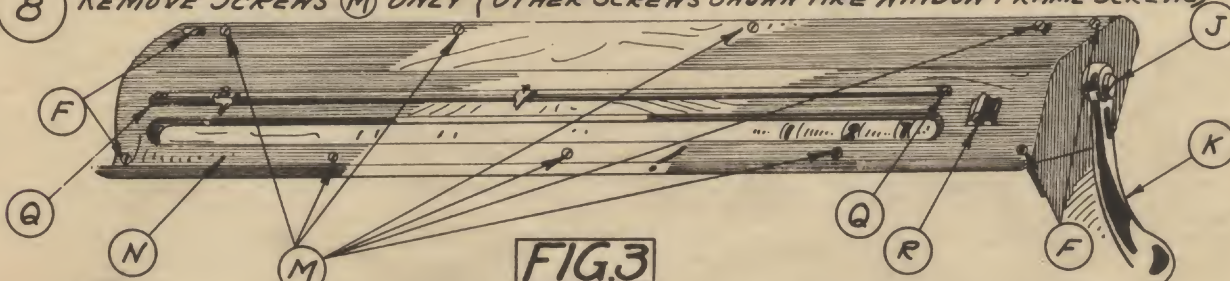


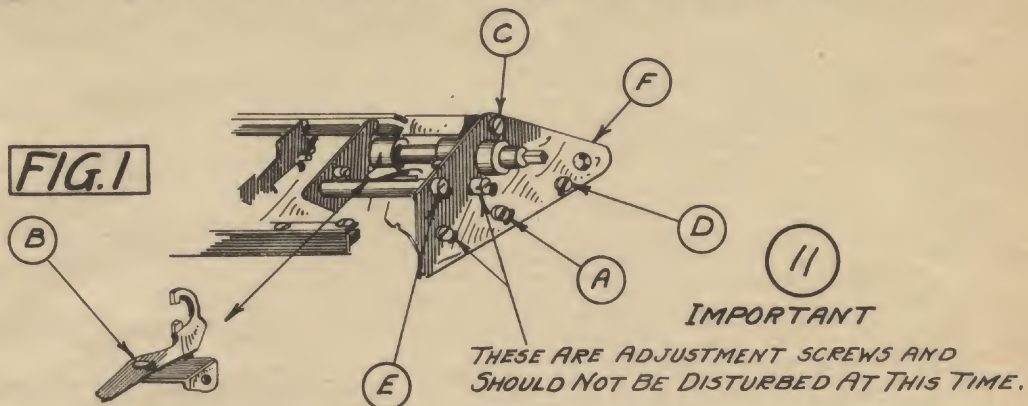
FIG.3

- 9 MECHANISM MAY NOW BE WITHDRAWN FROM THE CARRIAGE CASE (N).



DISMANTLING OPERATIONS-REAR CARRIAGE.

- (10) REMOVE SCREW (A) AND  $\frac{1}{2}$  CENT CONTROL LEVER (B) MAY BE REMOVED, LAY ASIDE.

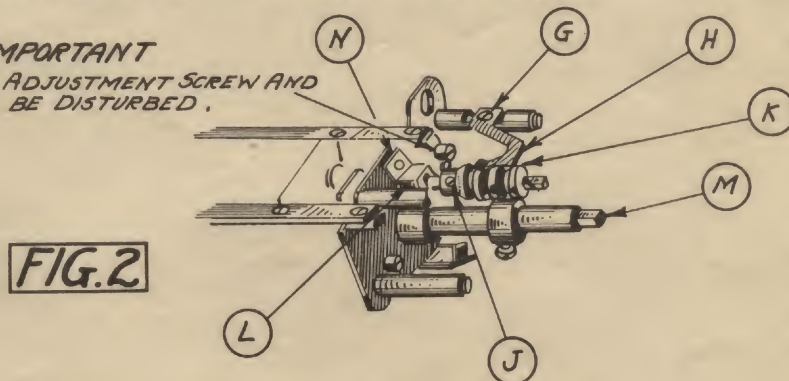


- (12) REMOVE SCREWS (C) (D) (E) AND PLATE (F) MAY BE WITHDRAWN.

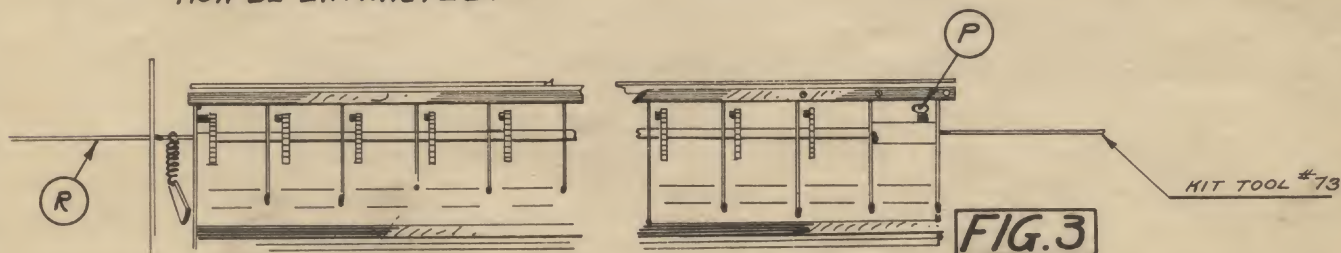
- (13) THE REAR CARRIAGE MECHANISM MAY NOW BE DISMANTLED FOR SPECIFIC CASES AS FOLLOWS-

- (14) TO REMOVE AND REPLACE AN INTERMEDIATE DIAL GEAR.

- (15) **IMPORTANT**  
THIS IS AN ADJUSTMENT SCREW AND MUST NOT BE DISTURBED.



- (16) REMOVE SCREW (G) AND EXTRACT SPRING (H) - LOOSEN SCREW (J) AND EXTRACT COLLAR (K) - REMOVE SCREW (N) AND LIFT OFF FORK (L) - SHAFT (M) WITH CONNECTING LINK MAY NOW BE EXTRACTED.

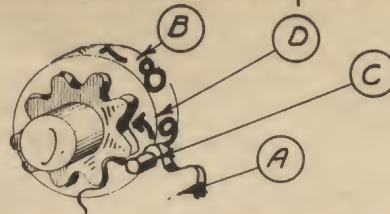


- (17) ANY ONE OF THE 21 INTERMEDIATE DIAL GEARS MAY BE EXTRACTED WITHOUT FURTHER DISMANTLING OF THE MECHANISM. PROCEED AS FOLLOWS-LOOSEN SCREW (P)-USE KIT TOOL #73 AND PUSH THIS KIT TOOL INTO SHAFT HOLE; THEREBY THREADING SUCH GEARS AS ARE NOT TO BE DISTURBED, INCIDENTLY PUSHING DIAL GEAR SHAFT (R) OUT THROUGH THE OPPOSITE END. WHEN KIT TOOL HAS THREADED THE GEAR TO BE REMOVED, WITHDRAW ROD SUFFICIENTLY TO REMOVE GEAR.



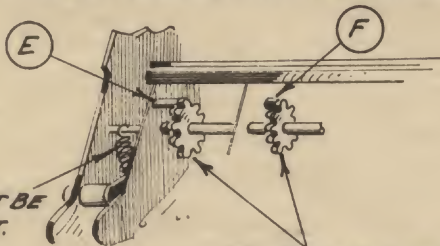
TO REMOVE AND REPLACE AN INTERMEDIATE DIAL GEAR (CONTINUED).

**FIG. 1**



- 19 THE TIMING OF THE INTERMEDIATE DIAL GEAR (A) WITH THE TOTALIZER DIAL GEAR (B) IS AS SHOWN: THE TOOTH WITH THE CARRYING PIN (C) MUST MESH IN TOOTH SPACE (D) BETWEEN '8' AND '9' ON DIALS.

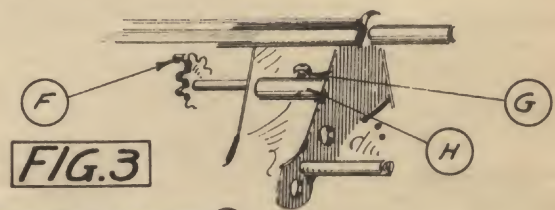
- 20 TO ASSEMBLE A NEW INTERMEDIATE DIAL GEAR INTO THE MECHANISM PLACE IT INTO THE SPACE FORMERLY OCCUPIED BY THE OLD, SEE THAT IT IS PROPERLY TIMED IN MESH AS ABOVE, PUSH THE SHAFT INTO IT AND INTO THE OTHER GEARS, INCIDENTLY PUSHING THE KIT TOOL #13 OUT.  
NOTE - WHEN COMPLETING A REPAIR SUCH AS THE ABOVE - CHECK THE POINTS NOTED BELOW.



- 21 THIS SPRING MUST BE HOOKED ON SHAFT.

**FIG. 2**

- 22 THE LAST DIAL GEAR CONTAINS THE LONG PIN (E) ALL OTHERS A SHORTER PIN (F).

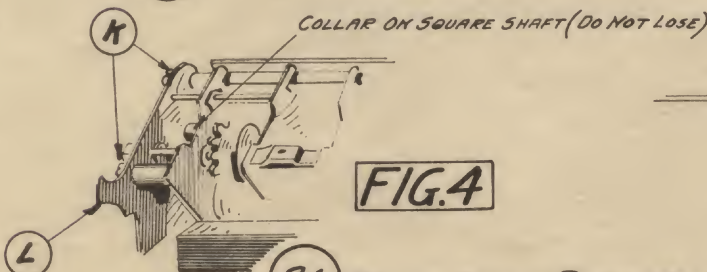


**FIG. 3**

- 23 BE SURE SCREW (G) IS TIGHT THROUGH SPACER (H) ONTO THE SHAFT.

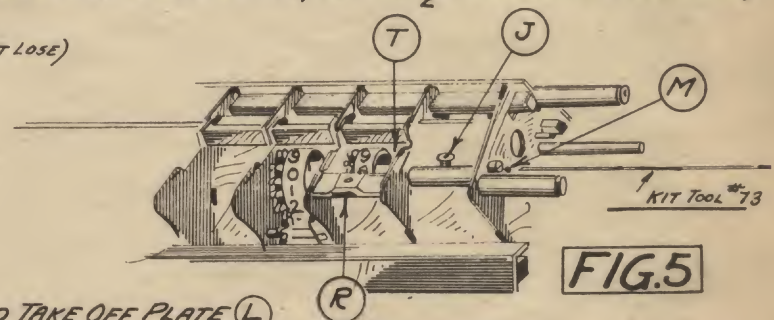
- 24 INSPECT THE TIMING MESH ON ALL DIALS.

- 25 TO REMOVE AND REPLACE THE REGULAR TOTALIZER DIALS (FOR THE 1/2-CENT DIAL SEE PLATE 4).



**FIG. 4**

- 26 REMOVE SCREWS (K) AND TAKE OFF PLATE (L).



**FIG. 5**

- LOOSEN SCREW (J) UNHOOK SPRING (P) FROM ROD (Q) ON SUCH DIALS AS ARE INTERFERED WITH BY ANCHOR PLATE (R); PLATE (R) MUST BE SPRUNG OUT AND REMOVED; INSERT KIT TOOL #13 INTO HOLE (M) UNTIL DESIRED DIAL IS THREADED - THEN WITHDRAW UNTIL IT IS FREE - THEN SWING UP THE CLEARING FINGER (T) AS FAR AS IT WILL GO - REVOLVE DIAL UNTIL CAM (S) ASSUMES POSITION SHOWN BELOW.



**FIG. 6**

- 27 DIAL MAY NOW BE EASILY REMOVED.

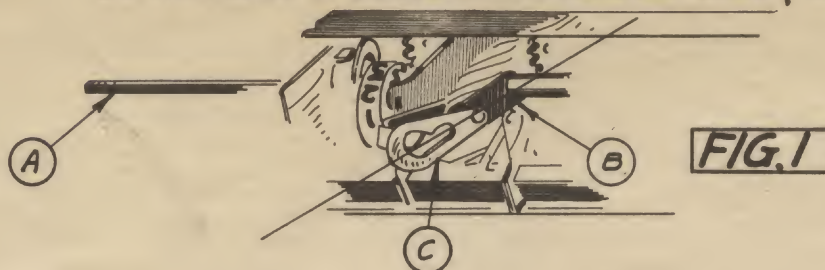


**FIG. 7**

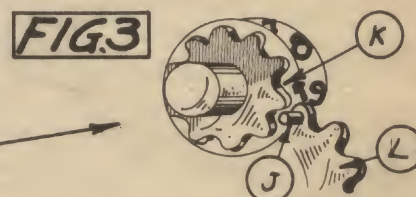
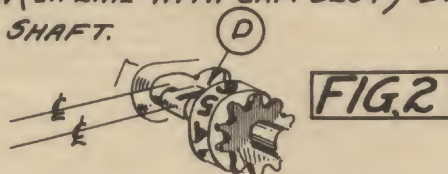
- 28 SPRING (P) MUST HAVE SUFFICIENT TENSION TO BRING THE CLEAR OUT SHAFT TO NEUTRAL POSITION.



## TO REPLACE A REGULAR TOTALIZER DIAL-(CONTINUED).



- 30 PLACE THE CARRIAGE UPSIDE DOWN AS SHOWN ABOVE, MANIPULATE THE SQUARE SHAFT (A) UNTIL IT HAS PLACED THE CLEAR FINGER LEVER (B) IN POSITION SHOWN, THIS WILL EXTEND THE CLEAR FINGER (C) OUTWARD. INSERT THE CAM POINT (D) ON DIAL AS SHOWN BELOW (IN LINE WITH CAM SLOT)-DIAL MAY NOW BE PROPERLY PLACED TO RECEIVE ITS SHAFT.



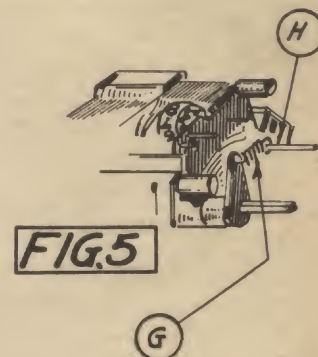
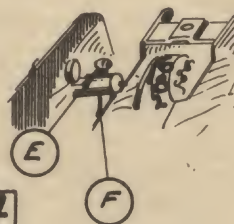
- 31 IMPORTANT TIMING POINT.  
THE TOOTH WITH THE CARRYING PIN (J) ON INTERMEDIATE DIAL GEAR (L) MUST MESH WITH THE TOOTH SPACE (K) BETWEEN 8 AND 9 ON THE DIAL WHEN NEW DIAL IS INSERTED AND MESHED INTO THE MECHANISM AS SHOWN.

- 32 ASSEMBLING OPERATIONS.

PUSH THE SHAFT THROUGH THE DIAL AND PUSH OUT THE KIT TOOL #73.

TIGHTEN SCREW (E) ON COLLAR (F).

HOOK UP SPRING (G) ON SHAFT (H).



- 33 TO REMOVE THE TOTALIZER  $\frac{1}{2}$ -CENT DIAL, OR ONE OF ITS CLEAR FINGERS, (7TH SPACE)- PREVIOUS REGULAR TOTALIZER DIAL DISMANTLING OPERATIONS ARE TO BE PERFORMED AS BELOW.  
- LOOSEN SCREW (E)-UNHOOK THE SPRING (G) FROM ROD (H)-INSERT KIT TOOL # 73 UNTIL  $\frac{1}{2}$ -CENT DIAL IS THREADED; THEN WITHDRAW ROD UNTIL  $\frac{1}{2}$ -CENT DIAL IS FREE.

HOWEVER - THE  $\frac{1}{2}$ -CENT DIAL IS SUPPLIED WITH TWO SETS OF CLEAR FINGERS AND THESE FINGERS MUST BE REMOVED FROM THE SQUARE SHAFT AND EXTRACTED WITH DIALS. TO DO THIS A KIT TOOL #14 IS SUPPLIED - THIS TOOL IS A SQUARE SHAFT WHICH IS INSERTED UNTIL THE  $\frac{1}{2}$ -CENT DIAL CLEAR FINGERS ARE THREADED; THEN WITHDRAWN UNTIL CLEAR FINGERS, SPACER, SPRINGS AND COLLARS ARE FREE.

WHEN SPRINGS ARE FREE FROM SPACER, UNHOOK THEM FROM SHAFT ALSO.



ASSEMBLING NOTES FOR 1/2 CENT TOTALIZER DIAL.

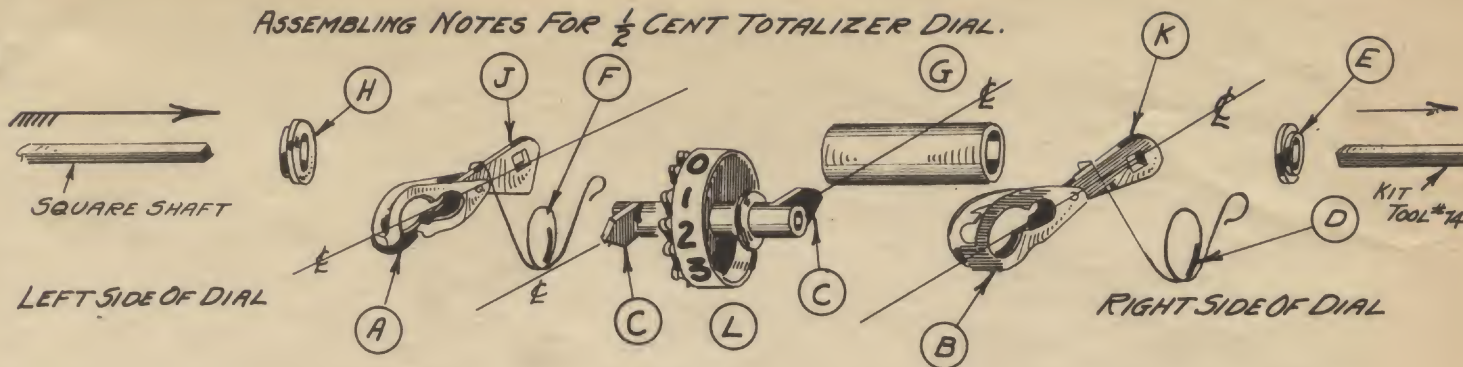


FIG. 1

35

LOCATE THE DIAL AS SHOWN ABOVE (CAMS (C) IN LINE WITH FINGERS (A) AND (B))  
IMPORTANT- FINGERS MUST BE IN POSITIONS AS SHOWN ABOVE- THEY CAN NOT BE REVERSED.

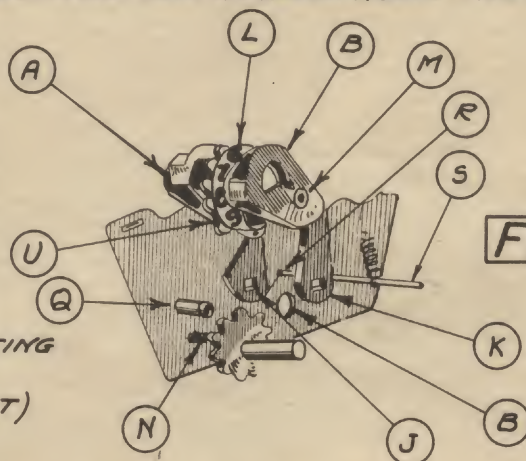


FIG. 2

36 IMPORTANT

DO NOT DISTURB THIS ADJUSTING  
SCREW (Q) IN ANY CASE.  
(FACTORY ADJUSTMENT)

37

PUSH THE DIAL (L) BACK INTO CAMS (A) AND (B) UNTIL HUB (M) IS IN POSITION SHOWN (THIS WILL ALLOW THE DIAL TO BE READILY TURNED)-ROTATE THE DIAL UNTIL THE TOOTH SPACE (U) (BETWEEN THE '8' AND '9') IS IN A POSITION SO THAT IT CAN BE DROPPED INTO MESH WITH TOOTH (N)  
NOTE CAREFULLY THE POSITION OF LEVERS (K) AND (J)-THEY MUST BE PLACED BETWEEN ADJUSTMENT SCREW (Q) AND SPRING SHAFT (S).

38

MESH THE DIAL GEAR TOOTH SPACE (U) WITH TOOTH (N) THREAD THE DIAL INTO POSITION BY PUSHING THE BEARING SHAFT AND EXTRACTING THE KIT TOOL. TIGHTEN THE SET SCREW IN THE LOCK COLLAR. NOTE- THIS SHAFT MUST NOT EXTEND BEYOND RIGHT HAND END PLATE OR IT WILL INTERFERE. PLACE COLLAR (H) IN HOLE (P) AND THREAD IT WITH SQUARE SHAFT. PLACE LEVER INTO POSITION IN LINE WITH SQUARE SHAFT AND THREAD IT WITH SQUARE SHAFT. PLACE SPRING UPON SPACING COLLAR (G) AS SHOWN.

39

THREAD THE SPACING COLLAR ON SQUARE SHAFT-PLACE THE WASHER (H) INTO HOLE IN PLATE WITH SPRING (T) IN POSITION SHOWN.

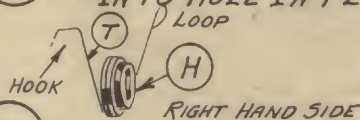


FIG. 3

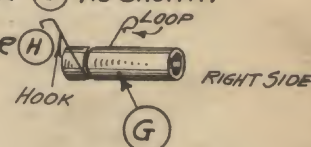


FIG. 4

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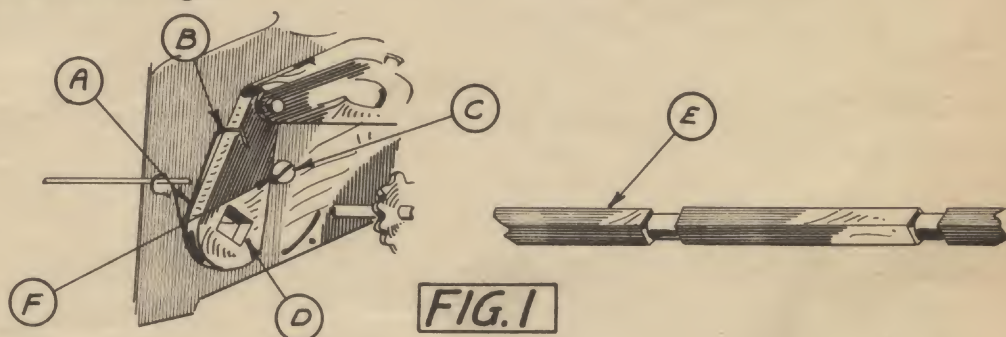
LIFT LEVER (K) INTO LINE AND THREAD LEVER AND COLLAR ON SQUARE SHAFT-PUSH SQUARE SHAFT ALL THE WAY THROUGH, EXTRACTING THE KIT TOOL #74 - HOOK SPRINGS (F) AND (D) TO LEVERS THE SAME AS ARE OTHER SPRINGS.



- 41 TO REMOVE, ADJUST AND REPLACE A REGULAR CLEAR FINGER.  
(SEE PLATE 4 AND 5 FOR REMOVING  $\frac{1}{2}$ -CENT DIAL CLEAR FINGER NOTES)

USE KIT TOOL #74-INSERT IT UNTIL THE DESIRED FINGER IS THREADED-DRAW BACK THE KIT TOOL UNTIL FINGER LEVER IS FREE-SEE THAT THE SMALL SPACING COLLAR AND SPRING REMAIN IN PLACE-REMOVE DIAL AS EXPLAINED ON PLATE 3 FINGER, FINGER LEVER AND DIAL MAY NOW BE EXTRACTED.

- 42 TO REPLACE, THREAD THE FINGER LEVER SQUARE SHAFT (NOTE THAT SMALL COLLAR (A) AND SPRING (B) ARE IN PLACE) MESH THE TEETH PROPERLY; AS EXPLAINED ON PLATE 4 AND ASSEMBLE DIAL. IF THERE IS A TENSION SPRING (B) ON THE SPACING COLLAR CONNECT IT AS SHOWN. NOTE-THE LEVERS TO THE RIGHT OF  $\frac{1}{2}$ -CENT DIALS ARE NOT EQUIPPED WITH SPRINGS (B).

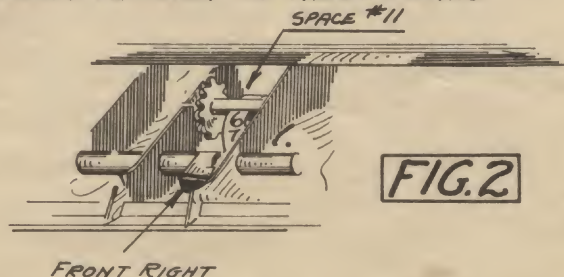


- 43 EACH LEVER TO THE LEFT STARTING WITH THE  $\frac{1}{2}$ -CENT DIAL IS PROVIDED WITH AN INDIVIDUAL ECCENTRIC ADJUSTING SCREW (C)-FOR THE PURPOSE OF ALIGNING THE SQUARE HOLES (D) IN THE LEVERS SO THAT THE SQUARE BEARING SHAFT (E) MAY BE SHIFTED FREELY FROM ONE POSITION TO ANOTHER. AFTER THE REPLACEMENT OF A LEVER, IT MAY BE NECESSARY TO READJUST THE ECCENTRIC THAT CONTROLS THE POSITION OF THE LEVER AFFECTED.

- 44 NOTE-WHEN THE SHIFT MOVEMENT OF THE SQUARE SHAFT IS IMPEDED IT IS CAUSED BY ONE OR MORE OF THE CLEAR FINGERS BEING OUT OF ALIGNMENT.

- 45 INSPECT EACH LEVER AND SEE THAT IT RESTS UPON THE ADJUSTING SCREW (C)-ANY CLEARANCE AT POINT (F) MUST BE TAKEN UP BY READJUSTING SCREW (C)-USE KIT TOOL #76.

- 46 TO REMOVE AND REPLACE A DIAL CHECK PAWL.  
USE KIT TOOL #73-THREAD DESIRED PAWL-WITHDRAW KIT TOOL #73 UNTIL PAWL IS FREE, UNHOOK SPRING, AND PAWL MAY BE REMOVED AND REPLACED BY REVERSING ABOVE OPERATIONS.  
DO NOT CHANGE THE SPRING TENSION ON THESE PAWLS.



- 47 NOTE-SPACE No. 11 ON MODEL MA 213 CONTAINS THE CARRIAGE LIFT CAM. WHEN MAKING REPAIRS CHECK THIS POSITION SEE THAT IT DOES NOT BIND THE CLEAR FINGER LEVER. THE PURPOSE OF THIS CAM IS TO PROVIDE A POSITIVE LIFT OF THE CARRIAGE WHEN CLEARING.



## REASSEMBLING AND ADJUSTMENT NOTES. ON REAR CARRIAGE

- 48 ASSEMBLE THE TENSION LEVER (BETWEEN THE COLLARS) UPON THE SQUARE SHAFT. HOOK UP THE SPRING ONTO THE INTERMEDIATE DIAL GEAR SHAFT. ASSEMBLE LEFT HAND END PLATE INTO PLACE AND TIGHTEN THE THREE SCREWS SECURELY.

- 49 ASSEMBLE THE CARRIAGE CLEAROUT OPERATING SHAFT AND LINKS.

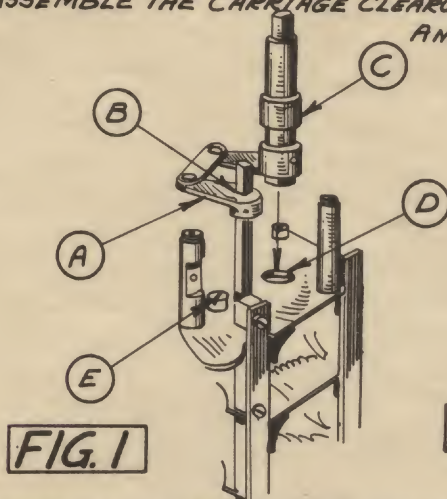
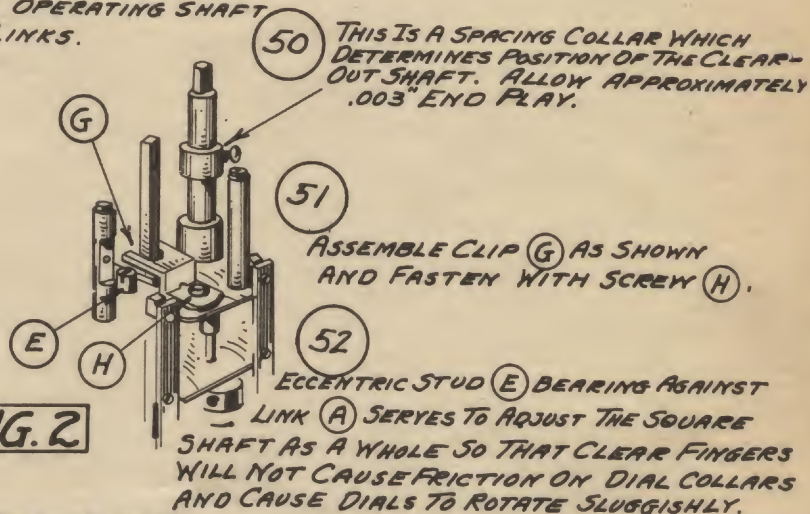


FIG. 1

FIG. 2



- 53 ASSEMBLE LINK WITH SQUARE HOLE (A) ONTO SQUARE SHAFT (B) ASSEMBLE SHAFT (C) INTO HOLE (D) NOTE THAT LINK (A) LIES BEHIND SCREW (E).

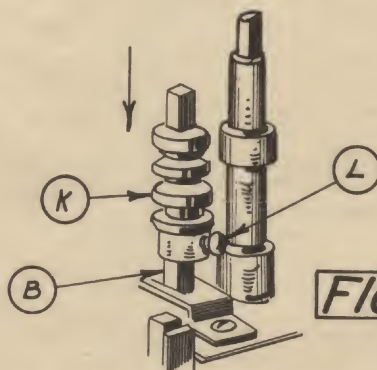


FIG. 4

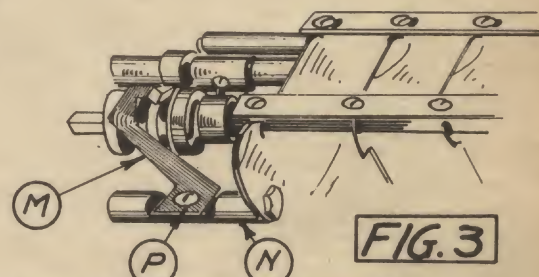


FIG. 3

- 54 ASSEMBLE DETENT SPRING (M) ON STUD (N) AND FASTEN WITH SCREW (A).

- 55 ASSEMBLE DETENT COLLAR (K) ON SQUARE SHAFT (B) NOTE THAT THE SCREW IS IN THE LOWER POSITION PLACE COLLAR (K) ON SQUARE SHAFT (B) AND TIGHTEN WITH SCREW (L) SECURELY.

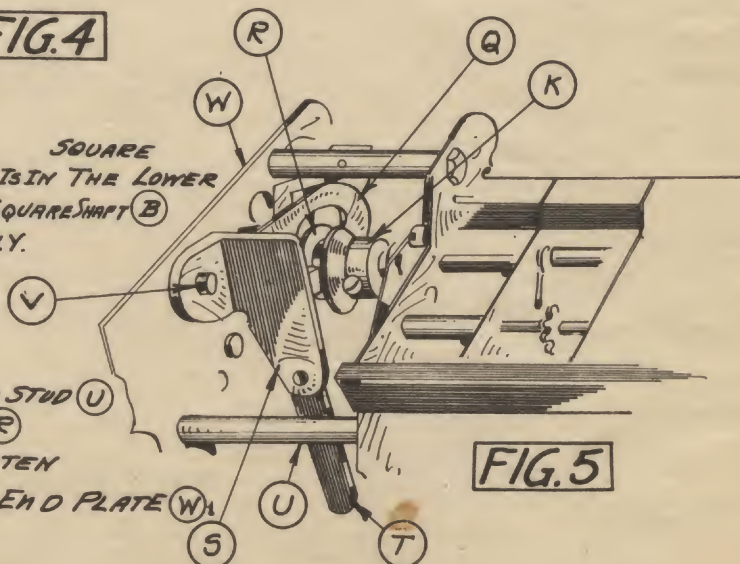


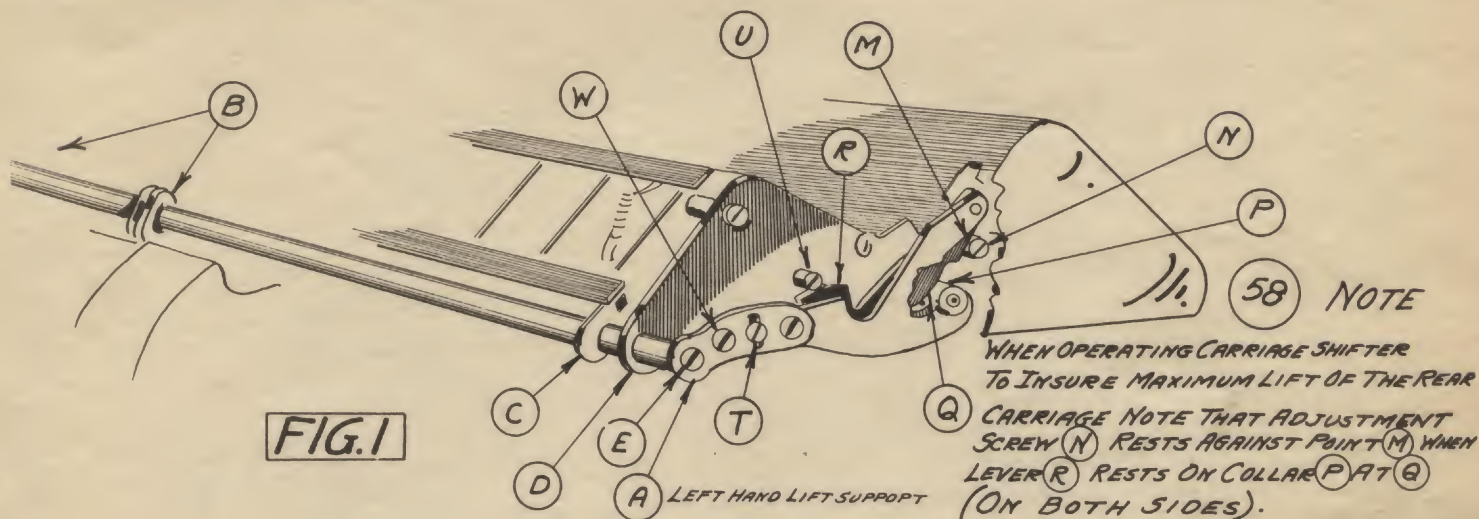
FIG. 5

- 56 PLACE SHIFT HANDLE (T) BEHIND STUD (U) PLACE YOKE (Q) INTO GROOVE (R) OF DETENT COLLAR (K) AND FASTEN PLATE (S) WITH SCREW (V) TO END PLATE (W).



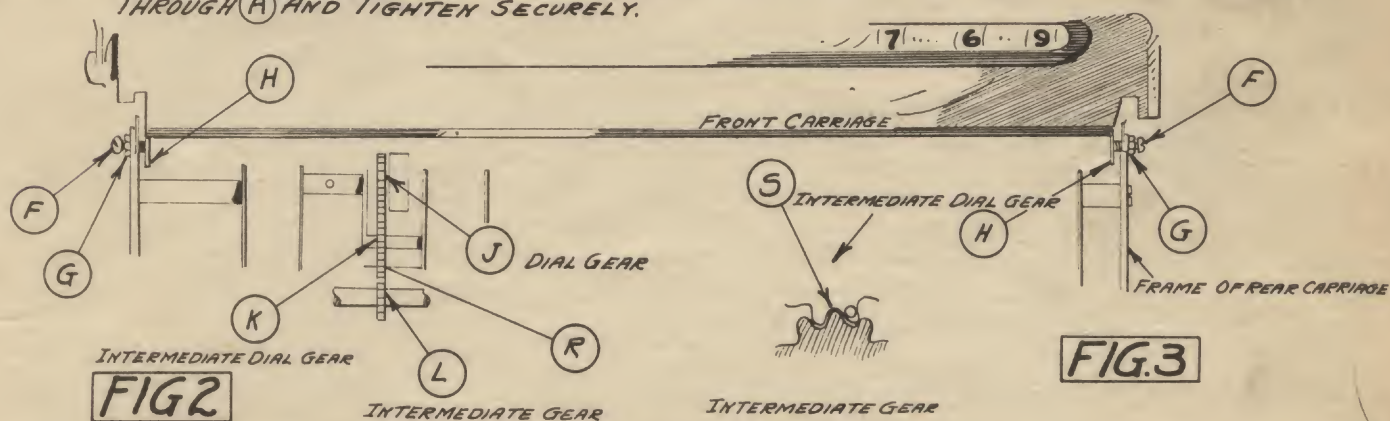
## ADJUSTING THE REAR CARRIAGE TO THE BASE OF THE MACHINE.

- 57 TO GAIN ACCESS TO THE ADJUSTMENTS AND TO NOTE THE RESULTS THE CARRIAGE CASE SHOULD BE OFF.



- 59 PLACE REAR CARRIAGE ON BASE OF MACHINE.-

INSERT CARRIAGE HINGE ROD THROUGH RIGHT HAND CARRIAGE LIFT SUPPORT (NOT SHOWN), AND THROUGH BEARINGS (B) (C) (D) - LIFT LEVER (A) INTO PLACE AND INSERT SCREW STUD (E) THROUGH (A) AND TIGHTEN SECURELY.



- 60 THE ALIGNMENT OF (K) TO (L) IS EFFECTED BY ADJUSTING SCREWS (F) AGAINST FACES (H) ON THE REAR PART OF FRONT CARRIAGE - DETERMINE IN WHICH DIRECTION THE CARRIAGE SHOULD BE ADJUSTED AND ADJUST WITH SCREWS (F) TO SUIT - WHEN PROPERLY ADJUSTED LOCK THE ADJUSTMENT WITH LOCK NUTS (G) THE CARRIAGE SHOULD MOVE UP AND DOWN FREELY BUT ALLOW NO MORE THAN .003" PLAY BETWEEN SCREW ENDS (F) AND FACES (H).

### 61 CAUTION.

ANY SIDEWISE ADJUSTMENT OF THE FRONT CARRIAGE AFFECTS THIS ALIGNMENT OF THE REAR CARRIAGE.

- 62 TO OBTAIN THE PROPER MESHING AS SHOWN IN FIG 2 OF INTERMEDIATE DIAL GEARS WITH INTERMEDIATE GEARS TWO ADJUSTMENTS ARE PROVIDED ON EACH SIDE OF THE CARRIAGE - SCREWS (U) ARE FOR UP AND DOWN MOVEMENT - FOR BACKWARD AND FORWARD ADJUSTMENT - LOOSEN SCREWS (W) AND ADJUST WITH SCREWS (T) SEE FIG. 1.



- 63 THE REAR CARRIAGE COVER CASE MAY BE ASSEMBLED TO CARRIAGE WHILE IT IS ON THE MACHINE.

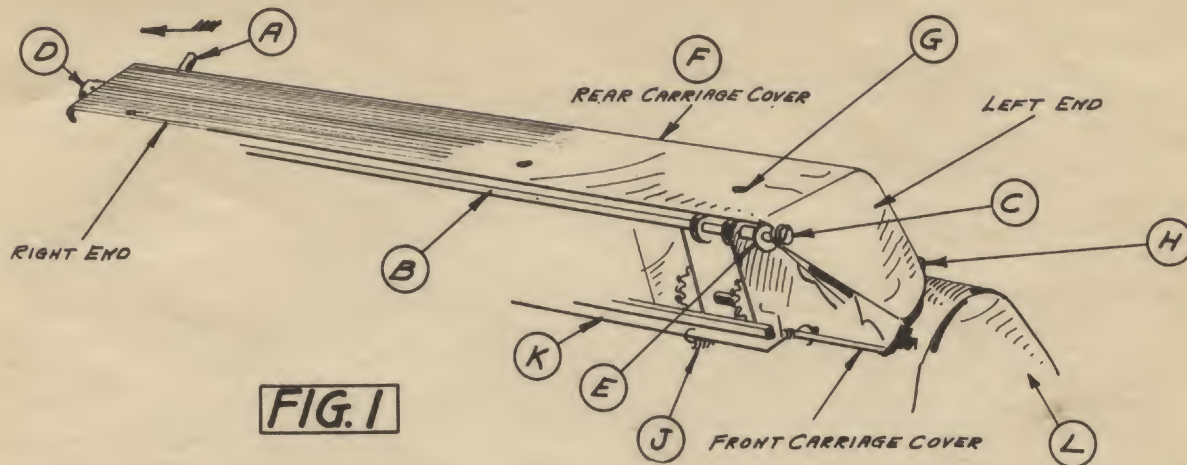


FIG. 1

- 64 IF THE HINGE ROD STUD (C), HANDLE (D) AND CARRIAGE SUPPORT LINK (E) ARE ASSEMBLED THEY MUST BE DISMANTLED. HINGE ROD (B) NEED NOT BE DISTURBED.
- 65 MOVE LEVER (A) IN DIRECTION OF ARROW—REPLACE CARRIAGE COVER CASE (F) (RIGHT END FIRST). LIFT UP LINK (E) INTO PLACE AND INSERT STUD (D) AND TIGHTEN SECURELY. REPLACE SCREWS (G) AND (H)—REPLACE HANDLE (D)—AND KNOB AT (A)
- 66 HOOK UP SPRINGS (J) (ATTACHED TO EACH END OF FRONT CARRIAGE CASE (L)) TO THE LOCK LEDGE (K)—AS SHOWN FIG. 1.

- 67 NOTE—WHEN THE CARRIAGES ARE PROPERLY MESHED; BEFORE ADJUSTING THE LOCK LATCHES (M) NOTE CAREFULLY 356 AND 358 ON PLATE 53—THIS BULLETIN.—SEE ALSO PLATE 66A—THIS BULLETIN—

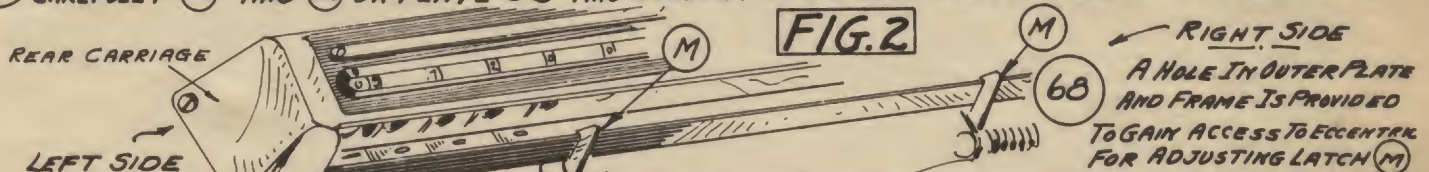


FIG. 2

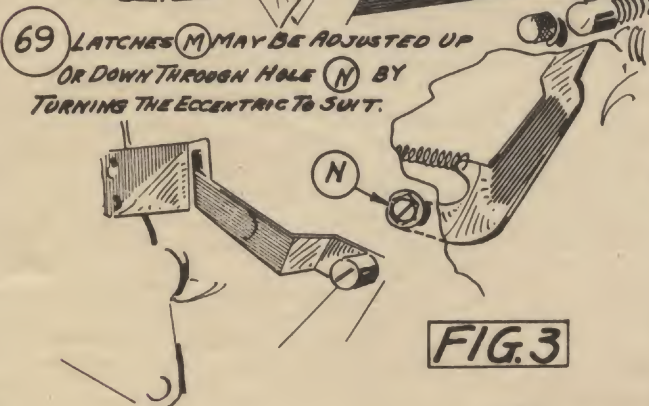


FIG. 3

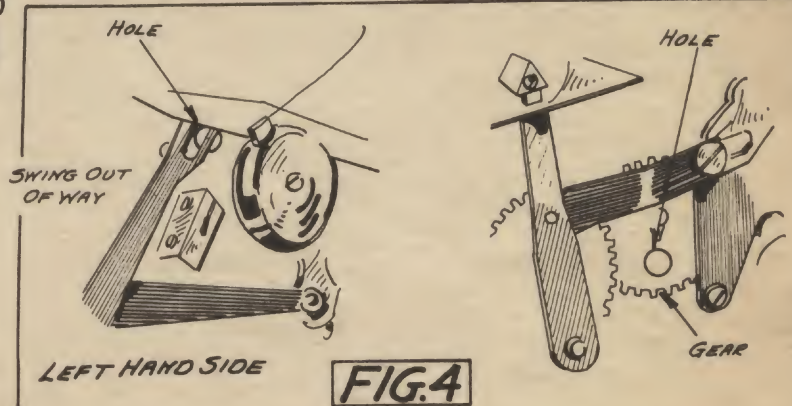
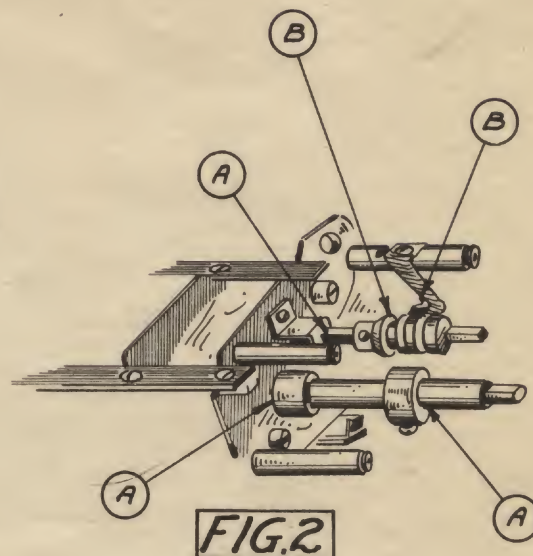
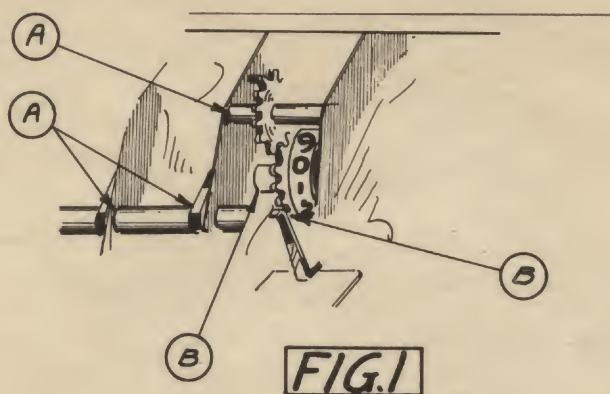


FIG. 4

- 70 TO ADJUST THE LATCHES ON THE FRONT CARRIAGE DO SO THROUGH HOLES SHOWN ABOVE.

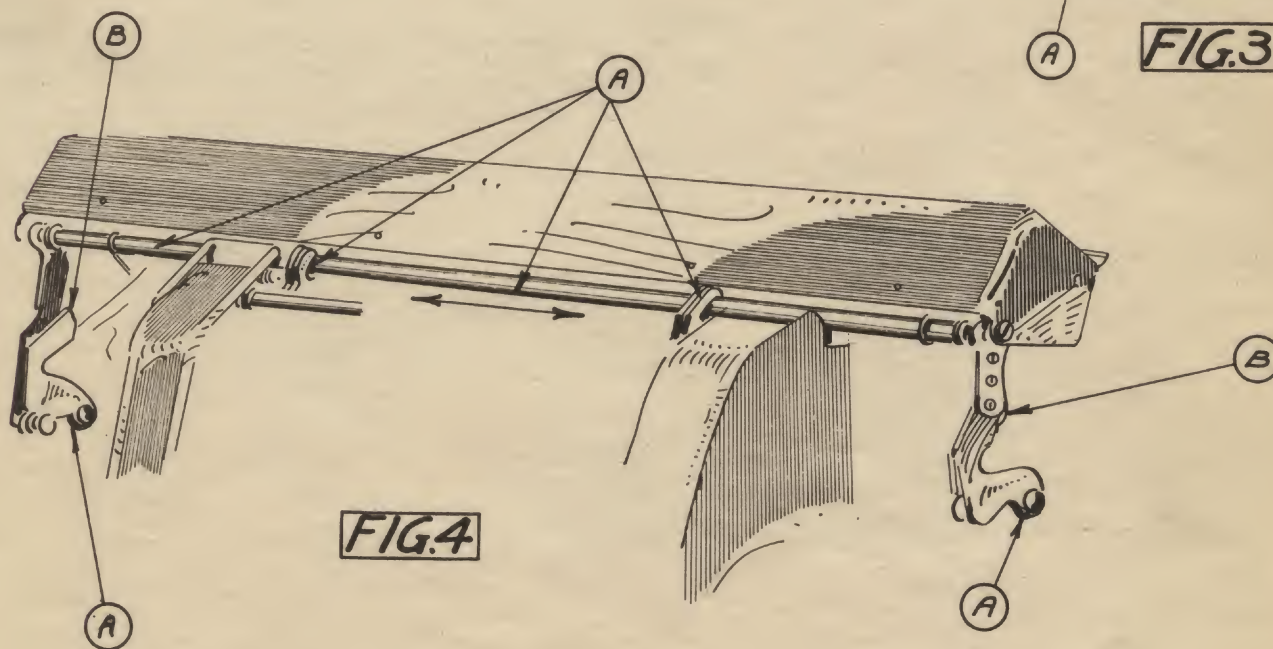
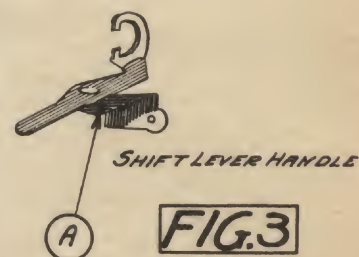


# OILING INSTRUCTIONS FOR REAR CARRIAGE.



72 POINTS INDICATED AS (A) ARE TO BE SPARINGLY OILED WITH KIT TOOL #72.  
- DO NOT USE OIL CAN. -

73 POINTS INDICATED AS (B) ARE TO RECEIVE A SLIGHT APPLICATION OF GREASE.





DISMANTLING OPERATIONS - FRONT CARRIAGE.

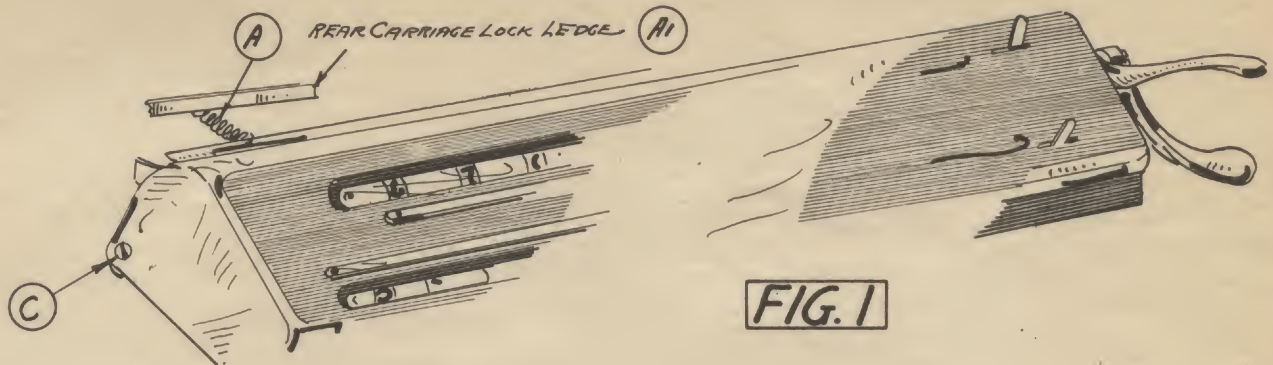


FIG. 1

- 74 UNHOOK SPRINGS (A) (ON EACH END OF CARRIAGE), FROM LOCK LEDGE (A1) - REMOVE EXTENSION STUD (C) ON FRONT CARRIAGE HINGE ROD. EXTRACT THE HINGE ROD ENTIRELY AND LAY ASIDE.
- 75 RELEASE CARRIAGE LOCK LATCHES AND CARRIAGE MAY BE LIFTED FROM MACHINE.

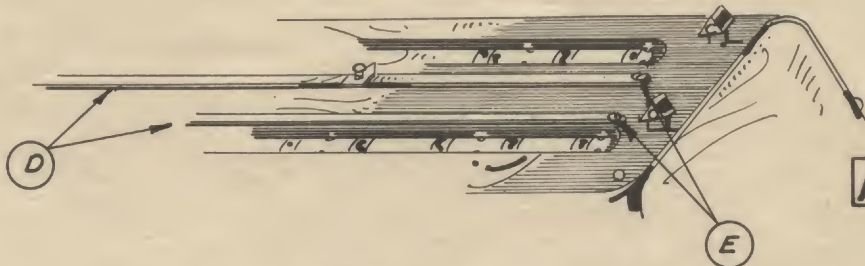


FIG. 2

- 76 DECIMAL POINTER RODS (D) MAY BE REMOVED BY TAKING OUT SCREWS (E) FROM EACH END
- 77 TO REMOVE THE WINDOW FRAME TAKE OUT ALL SCREWS (F) AND REMOVE KNOBS (G)

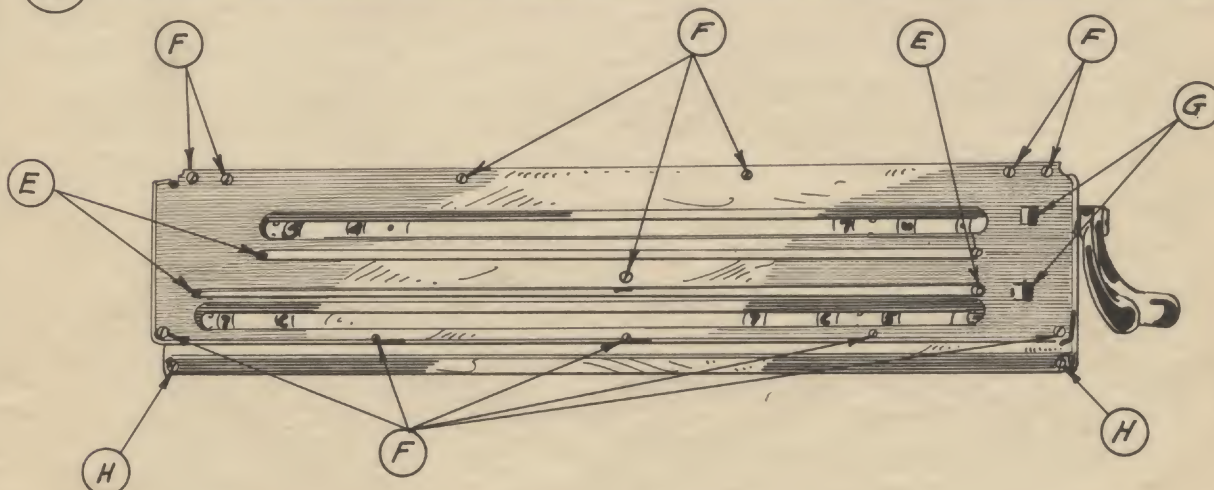
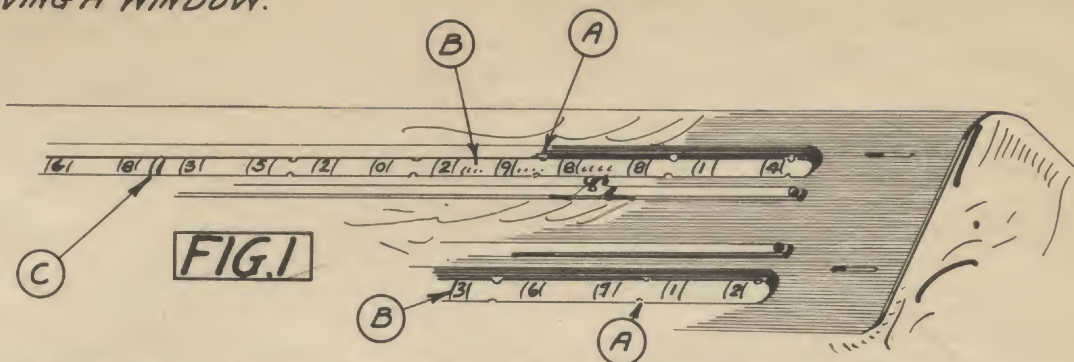


FIG. 3

- 78 SCREWS (H) NEED NOT BE DISTURBED TO REMOVE WINDOW FRAME.

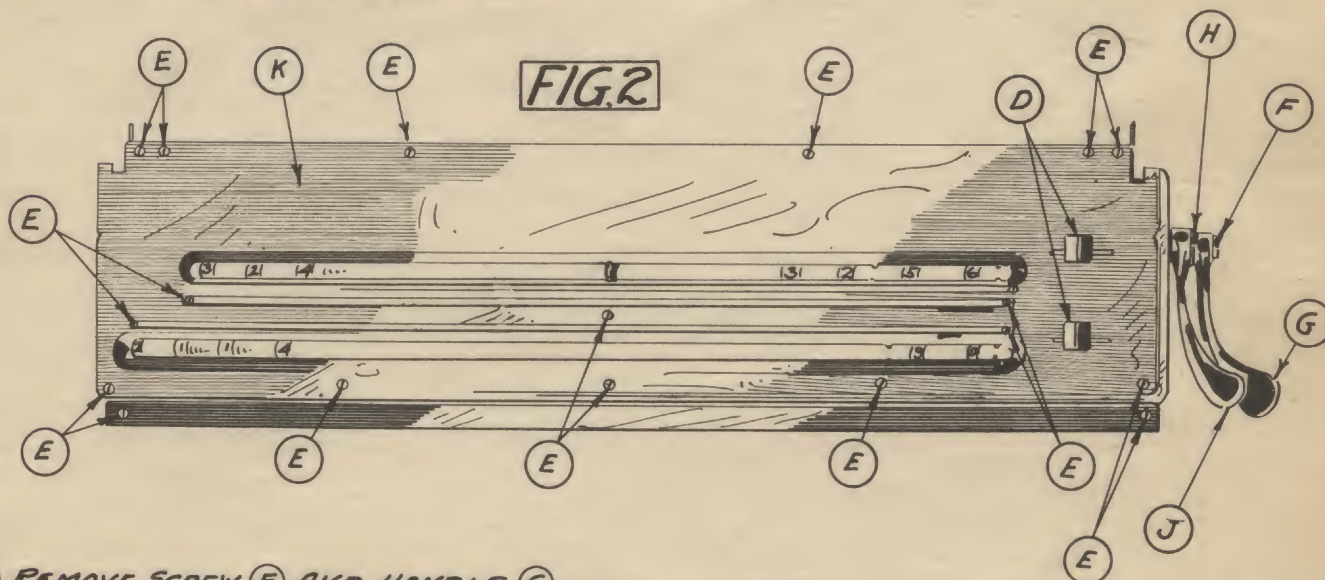


REMOVING A WINDOW.



- (80) THE WINDOWS OF THIS MODEL CARRIAGE ARE HELD IN BY CLIPS (A). THE UPPER WINDOW (B) CONTAINS CLIP (C) WHICH SPANS OVER THE FACE OF THE WINDOW AT THE CENTER OF THE CARRIAGE AND DIVIDES EACH SET OF DIALS. TO REMOVE THE WINDOWS, THE WINDOW FRAME MUST FIRST BE REMOVED TO GAIN ACCESS TO THIS CLIP AS WELL AS THE OTHERS WHICH MAY BE LOOSENEED FROM THE TOP AT (A).

- (81) TO REMOVE THE FRONT CARRIAGE COVER CASE, REMOVE ALL SCREWS (E) SHOWN BELOW. REMOVE KNOBS (D) AND WINDOW FRAME.



- (82) REMOVE SCREW (F) AND HANDLE (G).

- (83) REMOVE NUT (H) WITH TOOL #52 AND PRY OFF HANDLE (J).

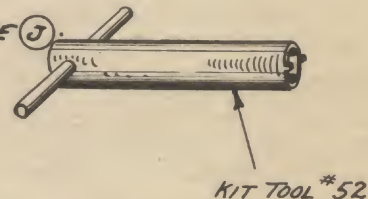


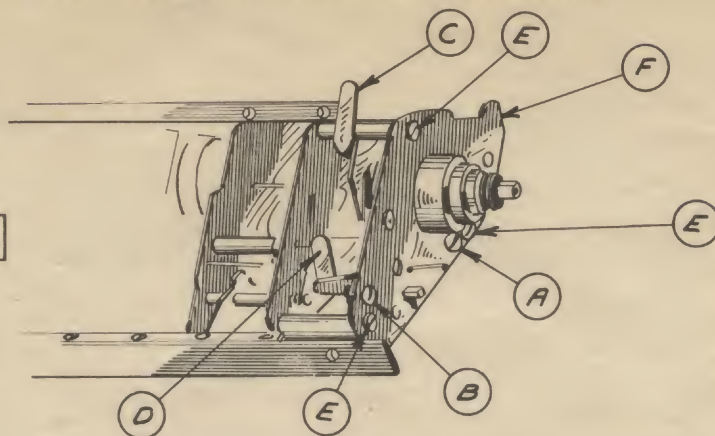
FIG. 3

- (84) FRONT CARRIAGE COVER CASE (K) MAY NOW BE REMOVED AND LAID ASIDE.



## DISMANTLING OPERATIONS-FRONT CARRIAGE

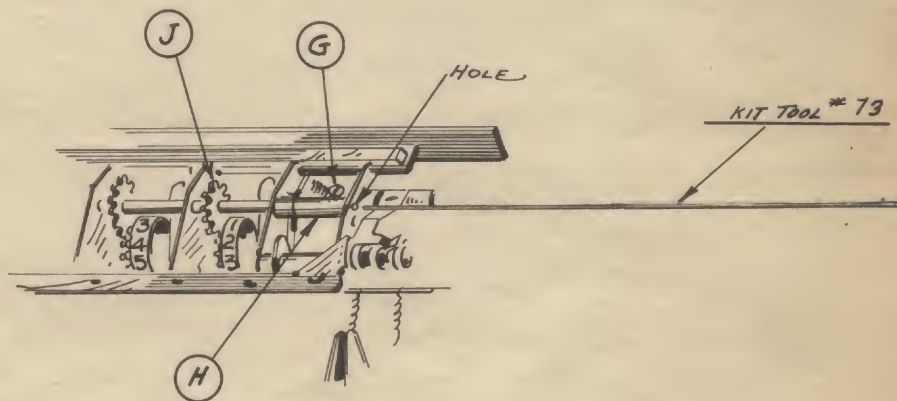
FIG.1



- 85 REMOVE SCREW (A) AND CONTROL LEVER (C) MAY BE TAKEN OFF.
- 86 REMOVE SCREW (B) AND CONTROL LEVER (D) MAY BE TAKEN OFF.
- 87 REMOVE SCREWS (E) AND REMOVE PLATE (F).
- 88 REMOVE COLLAR ON LEFT HAND SIDE OF PLATE (F) AND LAY ASIDE.
- 89 NOTE - THE FRONT CARRIAGE MECHANISM MAY NOW BE DISMANTLED FOR SPECIFIC CASES.

- 90 TO REMOVE AND REPLACE AN INTERMEDIATE DIAL GEAR IT IS NOT NECESSARY TO DISMANTLE THE MECHANISM FURTHER.

FIG.2

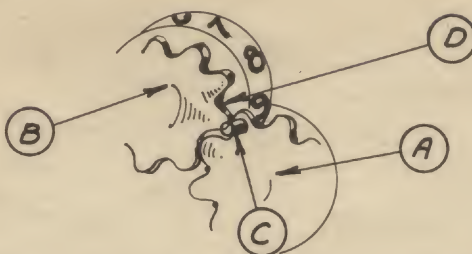


- 91 ANY ONE OF THE 21 INTERMEDIATE DIAL GEARS (J) MAY BE EXTRACTED AS FOLLOWS - LOOSEN SCREW (G) ON COLLAR (H) - USE KIT TOOL #73 AND THREAD THE DESIRED GEAR WITH IT; PUSHING THE ORIGINAL SHAFT OUT. WHEN GEAR THAT IS TO BE REMOVED IS THREADED, WITHDRAW THE KIT TOOL UNTIL GEAR IS FREE TO BE EXTRACTED.



TO REASSEMBLE AN INTERMEDIATE DIAL GEAR.

FIG. 1



93 THE TIMING OF THE INTERMEDIATE DIAL GEAR (A) WITH THE REGISTERING DIAL GEAR (B) IS AS SHOWN IN FIG. 1. - THE TOOTH WITH THE CARRYING PIN (C) MUST MESH INTO TOOTH SPACE (D) BETWEEN THE '8' AND '9' ON DIALS.

94 NOTE - UPON THE LAST INTERMEDIATE DIAL GEAR TO THE LEFT THE PIN (C) IS LONGER AND THIS DIAL GEAR IS NOT INTERCHANGEABLE WITH THE OTHERS.

95 TO ASSEMBLE A REPLACEMENT INTERMEDIATE DIAL GEAR INTO THE MECHANISM-PLACE IT INTO THE SPACE FORMERLY OCCUPIED BY THE UNIT TO BE REPLACED; SEE THAT IT IS PROPERLY TIMED IN MESH AS ABOVE. PUSH THE SHAFT INTO IT AND INTO THE OTHER GEARS, INCIDENTLY PUSH THE KIT TOOL OUT.

96 WHEN SHAFT IS AGAIN IN PLACE, INSPECT THE TIMING MESH ON ALL DIALS AND TIGHTEN THE SCREW INTO THE SPACER.

97 TO REMOVE AND REASSEMBLE A REGULAR REGISTERING DIAL (FOR THE  $\frac{1}{2}$  CENT DIAL SEE PLATE 15).

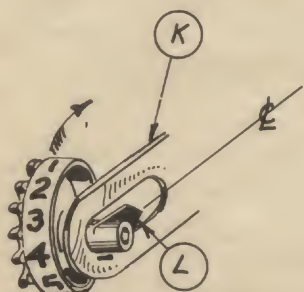


FIG. 3

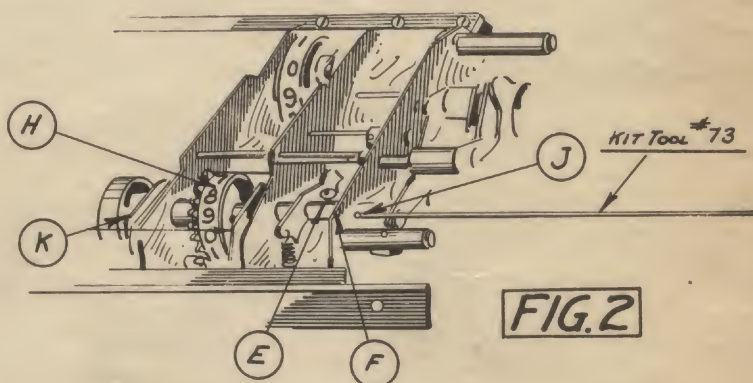


FIG. 2

98 LOOSEN SCREW (E) IN COLLAR (F) INSERT KIT TOOL #13 INTO HOLE (J) UNTIL THE DESIRED DIAL IS THREADED; THEN WITHDRAW KIT TOOL UNTIL IT IS FREE - THEN SWING UP THE CLEAR FINGERS (K) AS FAR AS THEY WILL GO, REVOLVE DIAL (H) UNTIL CAM (L) ASSUMES POSITION SHOWN ABOVE-FIG. 3. - DIAL NOW MAY BE EASILY REMOVED.



REASSEMBLING A REGULAR REGISTERING DIAL.

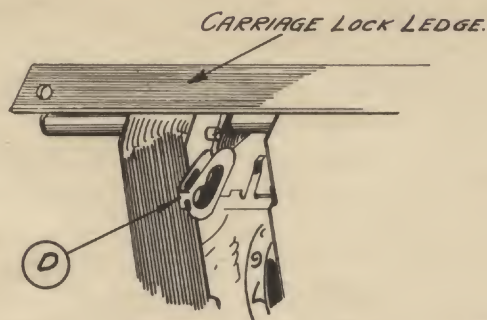


FIG. 1

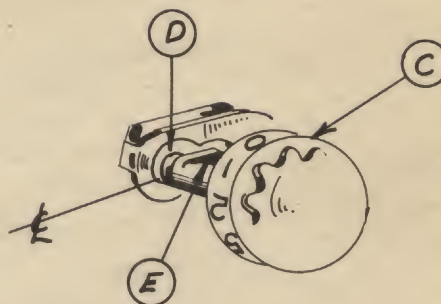


FIG. 2

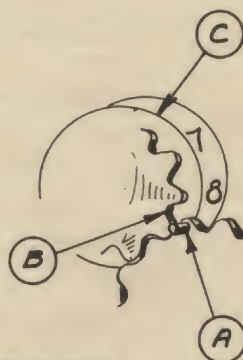


FIG. 3

- 100 THE TIMING OF THE INTERMEDIATE DIAL GEAR WITH THE REGISTERING DIAL GEAR IS AS SHOWN IN FIG. 3 - THE TOOTH WITH THE CARRYING PIN (A) MUST MESH INTO TOOTH SPACE (B) OF THE REGISTERING DIAL GEAR BETWEEN THE '8' AND '9' ON DIAL (C).
- 101 TO ASSEMBLE, PLACE THE CARRIAGE UPON ITS BACK AS SHOWN IN FIG. 1 - BRING CLEAR FINGERS (D) FORWARD AS SHOWN IN FIG. 2.
- 102 INSERT THE DIAL (C) WITH CAM POINT (E), IN POSITION AS SHOWN, INTO THE CLEAR FINGER (D) FIG. 2.
- 103 PUSH THE REGULAR SHAFT THROUGH THE REPLACED DIAL AND THROUGH THE OTHER DIALS, PUSHING THE KIT TOOL #73 OUT.
- 104 INSPECT THE CORRECT TIMING POSITION AND PROPER MESH ON ALL DIALS.
- 105 TIGHTEN SCREW IN SPACING COLLAR SECURELY.
- 106 **IMPORTANT-** THE REGISTERING DIALS ON THE FRONT CARRIAGE ARE NOT THE SAME AS THE TOTALIZING DIALS IN REAR CARRIAGE.

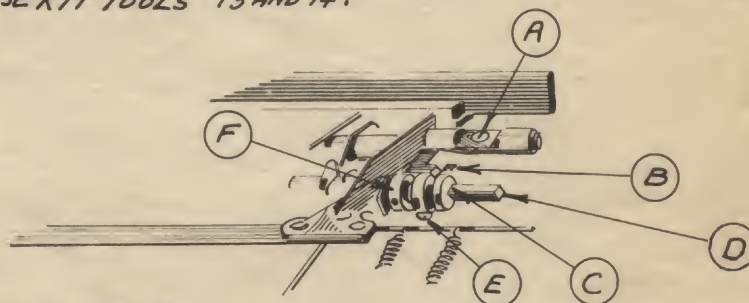


NOTES ON DISMANTLING AND REASSEMBLING THE  $\frac{1}{2}$ -CENT REGISTERING DIAL.

108 TO REMOVE THE REGISTERING  $\frac{1}{2}$ -CENT DIAL (OR ONE OF ITS CLEAR FINGERS) PREVIOUS REGISTERING DIAL DISMANTLING OPERATIONS ARE TO BE PERFORMED AS BELOW. LOOSEN SCREW IN SPACING COLLAR AND INSERT KIT TOOL #73 OR #74 OR BOTH, UNTIL  $\frac{1}{2}$ -CENT REGISTERING DIAL IS THREADED, WITHDRAW KIT TOOL UNTIL  $\frac{1}{2}$  CENT DIAL IS FREE.

109 NOTE - THE  $\frac{1}{2}$  CENT DIAL IS SUPPLIED WITH TWO SETS OF CLEAR FINGERS; THEREFORE THESE FINGERS MUST BE REMOVED FROM THE SQUARE SHAFT AND EXTRACTED WITH THE DIAL - TO DO THIS USE KIT TOOLS #73 AND #74.

FIG.1



110 REMOVE SCREW (A) AND SPRING (B).

111 LOOSEN SCREW (E) AND REMOVE COLLAR (F).

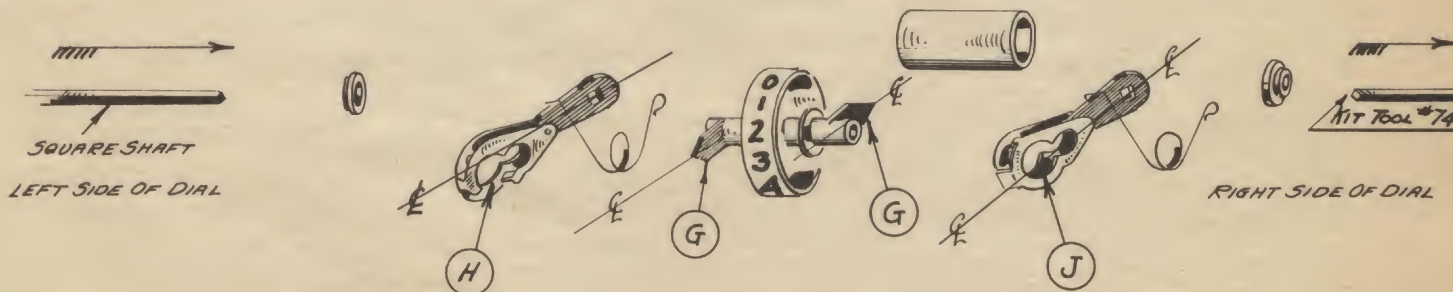
112 PUSH SQUARE SHAFT (D) FLUSH WITH END PLATE AND PUSH IT FURTHER WITH THE KIT TOOL #74 UNTIL THE  $\frac{1}{2}$ -CENT DIAL CLEAR FINGERS ARE THREADED THEN WITHDRAW TOOL UNTIL CLEAR FINGERS, SPACER, SPRINGS AND COLLARS ARE FREE.

WHEN SPRINGS ARE FREE FROM SPACER UNHOOK THEM FROM SHAFT ALSO.

113  $\frac{1}{2}$ -CENT REGISTERING DIAL COMPLETE WITH CLEAR FINGERS MAY NOW BE EXTRACTED.

114 ASSEMBLING NOTES.

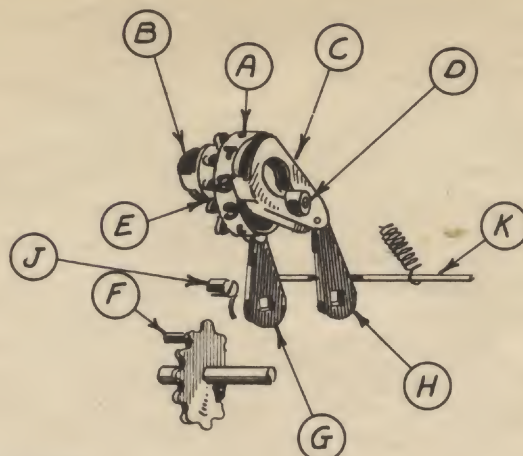
FIG.2



115 LOCATE THE DIAL AS SHOWN ABOVE PLACE CAMS (G) IN LINE WITH FINGERS (H) AND (J) IMPORTANT - FINGERS MUST BE IN POSITIONS AS SHOWN ABOVE, THEY MUST NOT BE REVERSED OR INTERCHANGED.



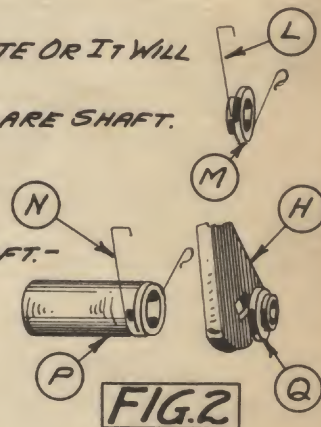
## ASSEMBLY NOTES ON $\frac{1}{2}$ CENT REGISTERING DIAL (CONTINUED.)



**FIG. 1**

- 116 **IMPORTANT -**  
DO NOT DISTURB THIS ADJUSTING SCREW (J) IN ANY CASE.
- 117 PUSH THE DIAL (A) BACK INTO CAMS (B) AND (C) UNTIL HUB (D) IS IN POSITION SHOWN (THIS WILL ALLOW THE DIAL TO REVOLVE FREELY) ROTATE THE DIAL UNTIL THE TOOTH SPACE (E) (BETWEEN THE '8' AND '9' ON THE DIAL) IS IN A POSITION SO THAT IT CAN BE DROPPED INTO MESH WITH TOOTH CONTAINING PIN (F) - THIS IS THE CORRECT TIMING POSITION. - NOTE THAT LEVERS (G) AND (H) ARE INSERTED BETWEEN ADJUSTING SCREW (J) AND SPRING ROD (K).
- 118 MESH THE DIAL GEAR WITH THE INTERMEDIATE GEAR, THREAD THE DIAL INTO POSITION BY PUSHING THE BEARING SHAFT AND EXTRACTING THE KIT TOOL #13 - TIGHTEN THE SET SCREW ON THE LOCK COLLAR.
- 119 NOTE - THIS SHAFT MUST NOT EXTEND BEYOND RIGHT HAND END PLATE OR IT WILL INTERFERE.
- 120 PLACE SPRING (L) UPON THE COLLAR (M) AND THREAD IT UPON THE SQUARE SHAFT.

- 121 LIFT THE LEVER (G) FIG. 1 INTO PLACE AND THREAD IT WITH SQUARE SHAFT. - PLACE SPRING (N) UPON SPACING COLLAR (P) AS SHOWN, AND THREAD IT UPON SQUARE SHAFT.
- 122 LIFT UP LEVER (H) FIG. 1 - AND THREAD IT UPON SQUARE SHAFT. - REPLACE COLLAR (Q) INTO HOLE IN FRAME AND CONTINUE THE THREADING OF THE MECHANISM UNTIL THE KIT TOOL IS EXTRACTED.
- 123 HOOK UP SPRINGS (L) AND (N) ONTO LEVERS (G) AND (H) AND HOOK LOOPS OVER THE SHAFT PROVIDED.

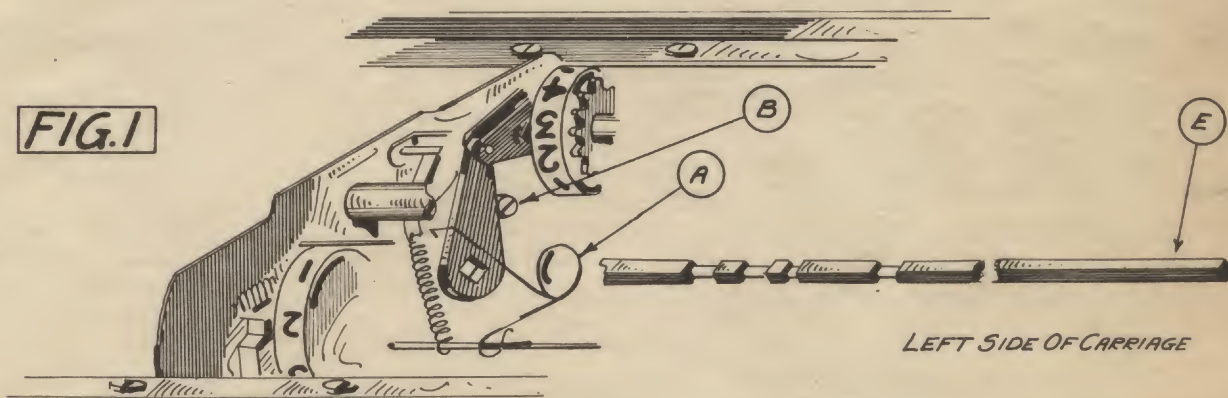


**FIG. 2**



TO REMOVE, ADJUST AND REPLACE A REGULAR CLEAR FINGER.  
(SEE PLATE 16 AND 17 FOR  $\frac{1}{2}$  CENT DIAL CLEAR FINGER NOTES)

- 125 REMOVE THE DETENT SPRING AND CLUTCH COLLAR (PLATE 16 ⑩ ⑪ ⑫ THIS BULLETIN)
- 126 PUSH THE SQUARE SHAFT (E) FLUSH WITH END PLATE AND WITH KIT TOOL #14 PUSH IT THROUGH THE MECHANISM UNTIL THE DESIRED CLEAR FINGER LEVER IS THREADED UPON THE KIT TOOL - THEN WITHDRAW THE TOOL UNTIL THIS LEVER IS FREE. SEE THAT THE SMALL SPACING COLLAR AND SPRING REMAIN IN PLACE.
- 127 REMOVE THE REGISTERING GEAR DIAL PLATE 14 ⑨⑦ ⑨⑧ - FINGER, FINGER LEVER AND DIAL MAY NOW BE EXTRACTED.  
- THIS BULLETIN -
- 128 TO REASSEMBLE THREAD THE FINGER LEVER UPON THE SQUARE SHAFT. NOTE THAT SMALL COLLAR AND SPRING IF ANY ARE IN PLACE, MESH THE GEARS PROPERLY SEE PLATE 15 FIG. 1-2-3 AND REASSEMBLE DIAL.  
- THIS BULLETIN -  
- IF THERE IS A SPRING (A) ON THE SPACING COLLAR HOOK IT ONTO THE LEVER AS SHOWN.



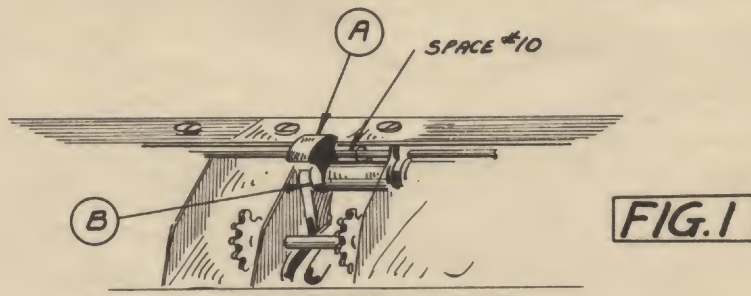
- 129 LEVERS TO THE LEFT OF THE NINTH DIAL POSITION ARE NOT EQUIPPED WITH SPRINGS (A) OR ADJUSTING SCREWS (B)
- 130 THE CLEAR FINGER LEVER ON THE EIGHTH DIAL POSITION DIFFERS FROM THE OTHERS AND IS NOT INTERCHANGEABLE.
- 131 ALL LEVERS EQUIPPED WITH SPRINGS (A) ARE ALSO PROVIDED WITH AN ADJUSTMENT SCREW (B) FOR THE PURPOSE OF ALIGNING THE SQUARE HOLES IN LEVERS SO THAT SQUARE SHAFT MAY BE SHIFTED FREELY FROM ONE POSITION TO ANOTHER. AFTER THE REPLACEMENT OF A LEVER; IT MAY BE NECESSARY TO ADJUST THE SCREW (B) TO SUIT.
- 132 - NOTE - WHEN THE SHIFT MOVEMENT OF THE SQUARE SHAFT IS IMPEDED IT IS CAUSED BY ONE OR MORE OF THE CLEAR FINGER LEVERS BEING OUT OF ALIGNMENT. - DETERMINE WHICH LEVER (OR LEVERS) IT IS AND ADJUST SCREWS (B) ACCORDINGLY.



TO REMOVE AND REPLACE A REGISTERING DIAL CHECK PAWL.

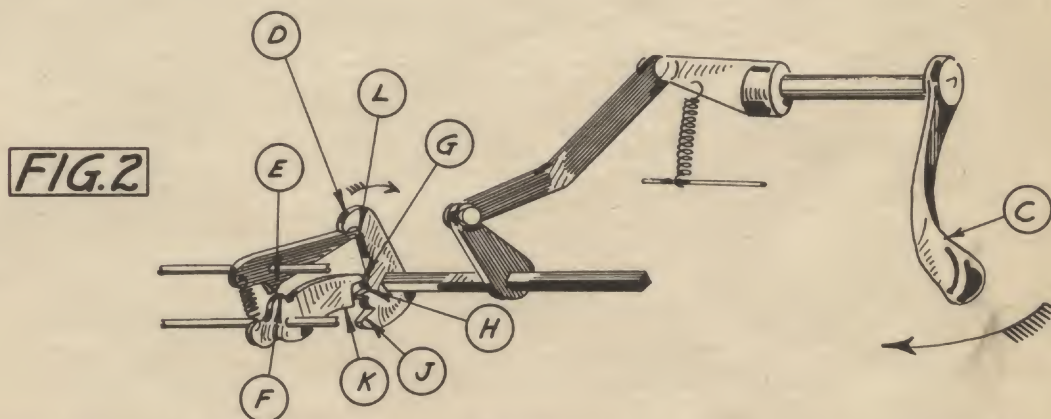
134 USE KIT TOOL #73 AND THREAD DESIRED PAWL UPON IT-THEN WITHDRAW THE TOOL UNTIL PAWL IS FREE, UNHOOK SPRING AND PAWL MAY BE REMOVED.

135 TO REPLACE REVERSE THE OPERATIONS. NOTE: DO NOT CHANGE THE SPRING TENSION ON THESE PAWLS.



136 NOTE-SPACE NUMBER 10 FROM THE RIGHT ON (MODEL MA 213) CONTAINS CARRIAGE LIFT CAM (A). WHEN MAKING REPAIRS, CHECK THIS POSITION TO SEE THAT IT DOES NOT BIND THE CLEAR FINGER LEVER AT (B).

137 THE PURPOSE OF THIS CAM IS TO PROVIDE A POSITIVE LIFT OF THE CARRIAGE WHEN CLEARING.



138 THIS MODEL (MA 213) FRONT CARRIAGE IS PROVIDED WITH A PARTIAL STROKE LOCK MECHANISM FOR THE REGISTERING DIAL CLEAROUT - MOVEMENT OF HANDLE (C) IN DIRECTION OF ARROW MOVES POINT (D) IN DIRECTION OF ARROW THIS ALLOWS POINT (E) TO DROP AND (E) REST UPON POINT (F) FURTHER MOVEMENT OF HANDLE ALLOWS TOOTH (G) TO ENGAGE TOOTH SPACE (H) THIS HOLDS HANDLE (C) FROM RETURNING TO NEUTRAL; FURTHER MOVEMENT OF THE HANDLE (C) CAUSES THE LATCHING OF (E) AND (F) BECAUSE POINT (J) HAS LIFTED LEVER (K) UPWARD-AT THE SAME TIME THIS UPWARD MOVEMENT OF (K) HAS UNLATCHED TOOTH (G) FROM (H) -THE RETURN OF THE HANDLE (C) CAUSES POINT (D) TO STRIKE POINT (L) CAUSING DISENGAGEMENT OF POINTS (E) AND (F) AND MECHANISM IS AGAIN NEUTRALIZED.

139 THIS MECHANISM MAY BE DISMANTLED FROM ITS RESPECTIVE SHAFTS BY WITHDRAWING THE SHAFTS UNTIL PARTS ARE FREE.



FURTHER DISMANTLING OF THE FRONT CARRIAGE.

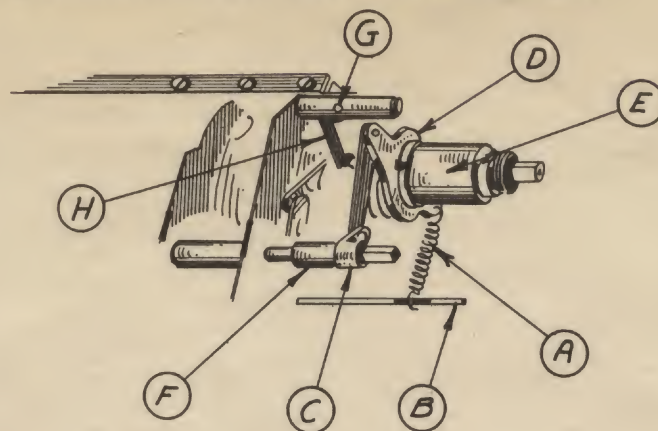


FIG. 1

- 141 UNHOOK SPRING (A) FROM SHAFT (B) REMOVE (C) AND YOKE (D) FROM STUD (E) REMOVE COLLAR (F) REMOVE SCREW (G) AND SPRING (H) LAY THESE PARTS ASIDE.

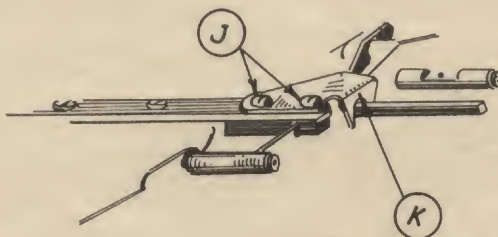


FIG. 2

- 142 REMOVE SCREWS (J) AND REMOVE RETAINER (K) AND LAY ASIDE.

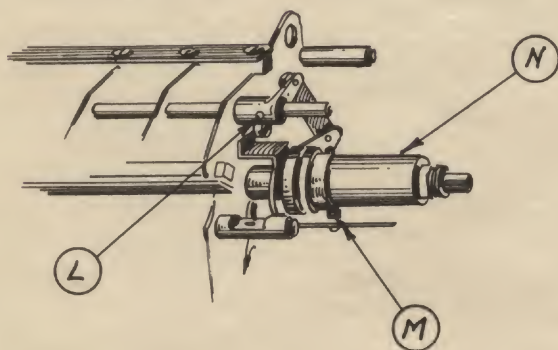


FIG. 3

- 143 WITH KIT TOOL #68 REMOVE PIN (L) UNHOOK SPRING (M) WITHDRAW UNIT (N) WHICH IS AN ASSEMBLY THAT MUST BE FURTHER DISMANTLED.



FURTHER DISMANTLING OF THE FRONT CARRIAGE.

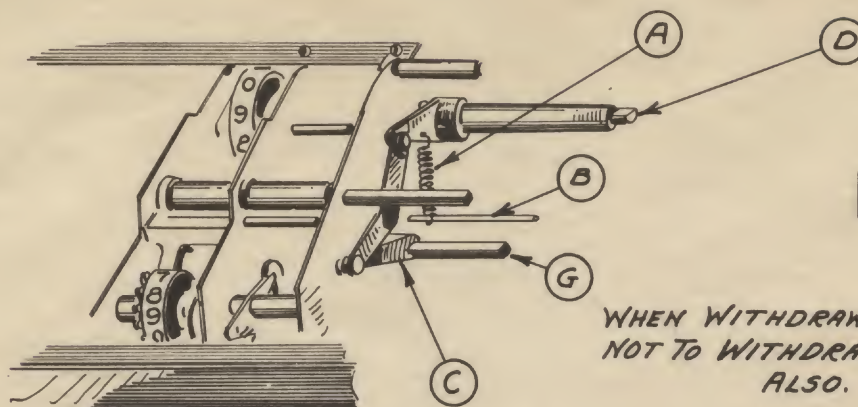


FIG. 1

WHEN WITHDRAWING PART (C) BE CAREFUL NOT TO WITHDRAW THE SQUARE SHAFTS (G) ALSO.

- 145 UNHOOK SPRING (A) FROM SHAFT (B).  
REMOVE UNIT (C) AND (D) AS A WHOLE AND LAY ASIDE.

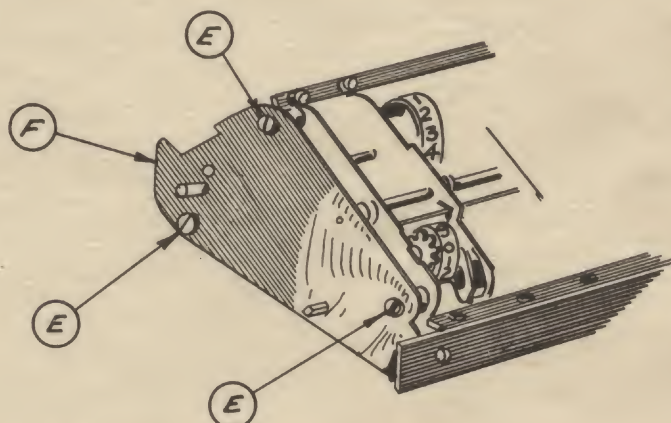


FIG. 2

- 146 REMOVE SCREWS (E) AND PLATE (F) MAY BE TAKEN OFF AND LAID ASIDE.

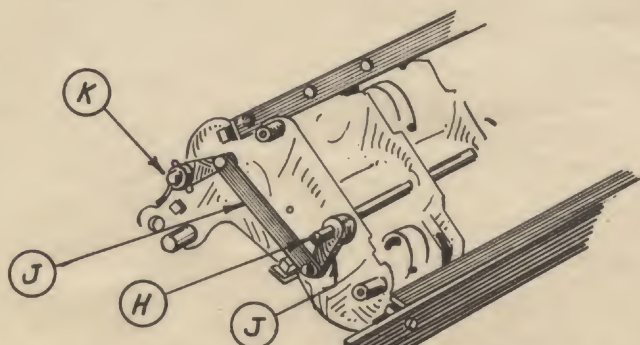


FIG. 3

- 147 REMOVE LINK MECHANISM (J) COMPLETE WITH SHAFT (K) FROM THE SQUARE SHAFT (H) AND SWING IT ASIDE. DO NOT DISTURB THE POSITION OF THE SQUARE SHAFT (H).
- 148 IT IS NOW POSSIBLE TO REMOVE COUNTING DIALS AND ASSOCIATED PARTS WITHOUT FURTHER DISMANTLING.



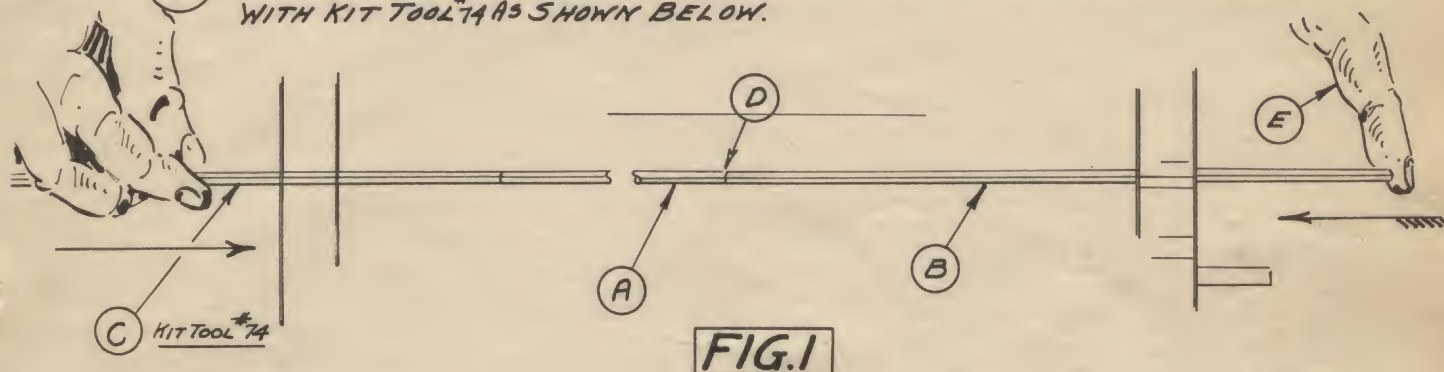
TO REMOVE A LEFT OR RIGHT HAND COUNTING DIAL.

150 USE KIT TOOL \*73 AND THREAD THE DIAL TO BE REMOVED UPON IT.-DRAW BACK THE TOOL AND THE DIAL WILL DROP DOWN; WHEN IT MAY BE EASILY REMOVED FROM THE CLEAR FINGER.

151 TO REASSEMBLE COUNTING DIAL PLACE IT INTO CLEAR FINGER AND THREAD IT AGAIN WITH THE SHAFT PUSHING OUT THE KIT TOOL.

152 TO REMOVE A COUNTING DIAL CLEAR FINGER.

153 REMOVE THE DIAL AS DESCRIBED ABOVE-THREAD THE DESIRED FINGER LEVER WITH KIT TOOL \*74 AS SHOWN BELOW.



154 NOTE THE SQUARE SHAFT OF THE COUNTING DIALS IS COMPOSED OF TWO SEPARATE SHAFTS (A) AND (B)-WHEN THE KIT TOOL \*74 IS INSERTED IT IS NECESSARY TO MAINTAIN A FIRM CONTACT AT (D) — THIS IS DONE BY EXERTING PRESSURE INWARD WITH THE FINGER (E) OF ONE HAND ON SHAFT (B), WHILE THE OTHER HAND INSERTS THE KIT TOOL (C) UNTIL DESIRED CLEAR FINGER LEVER IS THREADED-KIT TOOL IS THEN WITHDRAWN SLIGHTLY TO FREE THE FINGER LEVER-WHERE UPON FINGER LEVER WILL DROP OUT.

155 TO REASSEMBLE A CLEAR FINGER SIMPLY REVERSE OPERATIONS AS ABOVE.

156 NOTE- IN THE SPACE OCCUPIED BY THE  $\frac{1}{2}$ -CENT REGISTERING DIAL THE CLEAR FINGER LEVER FOR THE COUNTING DIAL DIFFERS AND IS NOT INTERCHANGEABLE-BUT ITS FUNCTIONING, REMOVAL AND REPLACEMENT OPERATIONS ARE THE SAME.

157 TO REMOVE CHECK PAWLS AND SPRINGS FOR COUNTING DIALS-THREAD PART TO BE REMOVED WITH KIT TOOL \*73 AND EXTRACT.

158 NOTE-THE CHECK PAWL SPRINGS FOR COUNTING DIALS (LEFT HAND SET) DIFFER IN TENSION FROM THOSE USED ON RIGHT HAND SET OF COUNTING AND CARRYING DIALS.



## REASSEMBLING OPERATIONS - FRONT CARRIAGE.

- 160 ASSEMBLE SHAFT (P) INTO HOLE IN FRAME (Q).

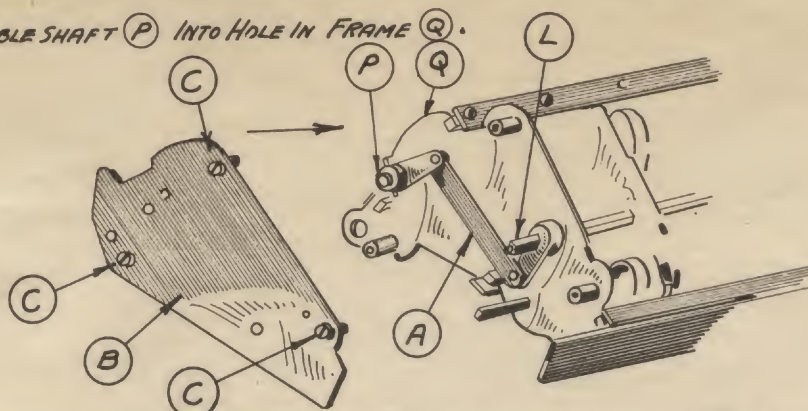
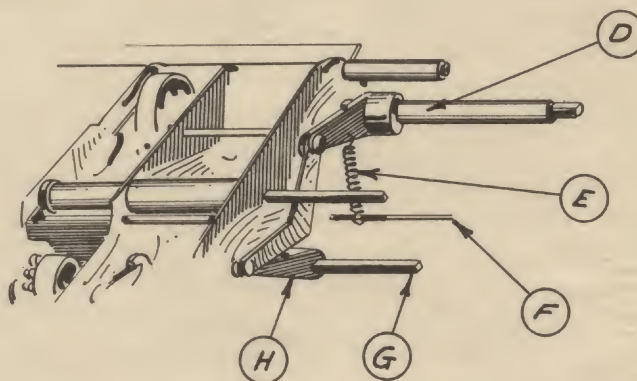


FIG. 1

- 161 ASSEMBLE THE LINK MECHANISM (A) TO SQUARE SHAFT (L) ASSEMBLE END PLATE (B) TO LEFT END OF CARRIAGE WITH THREE SCREWS (C).

FIG. 2



- 162 ASSEMBLE THE LOWER CLEAR OUT HANDLE SHAFT AND CONNECTING LINK (D) AND CONNECT SPRING (E) ONTO SHAFT (F) DO NOT DISTURB LOCATION OF THE SQUARE SHAFT (G) WHEN ASSEMBLING LINK ARM (H) ON SQUARE SHAFT (G).

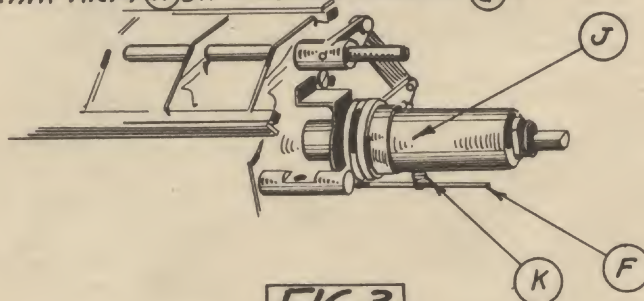
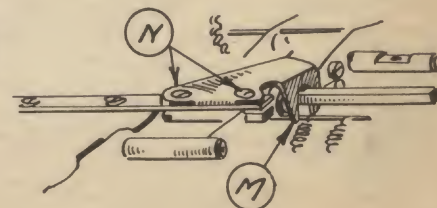


FIG. 3

- 163 ASSEMBLE THE COUNTING DIAL CLEARING SHAFT AND MECHANISM (J) AND HOOK UP SPRING (K) ONTO SHAFT (F)

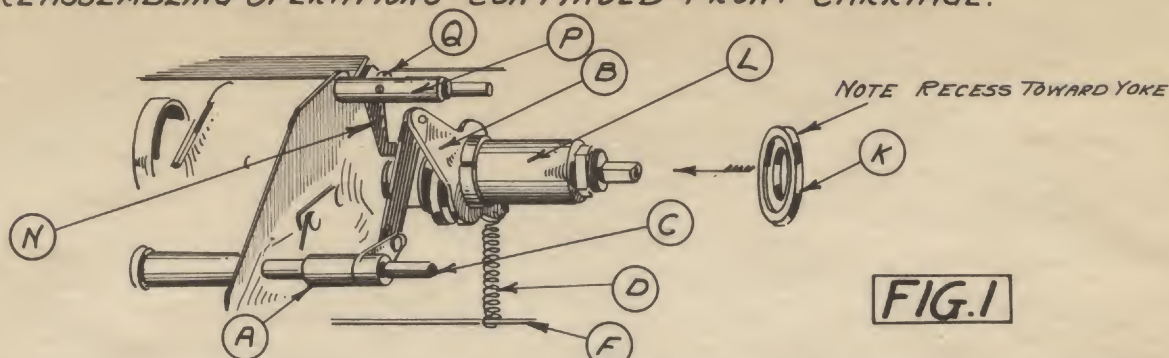
- 164 ASSEMBLE THE RETAINER (M) FASTEN WITH SCREWS (N).

FIG. 4

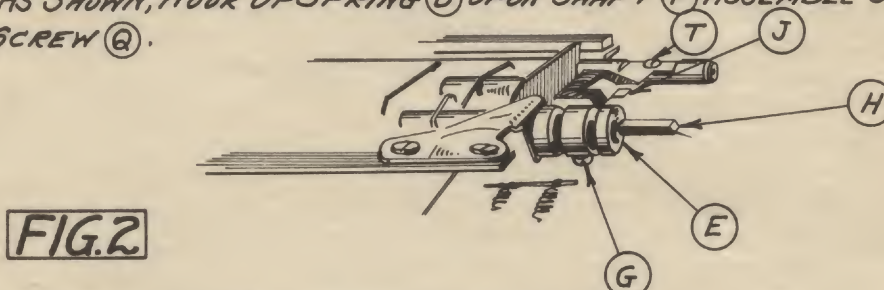




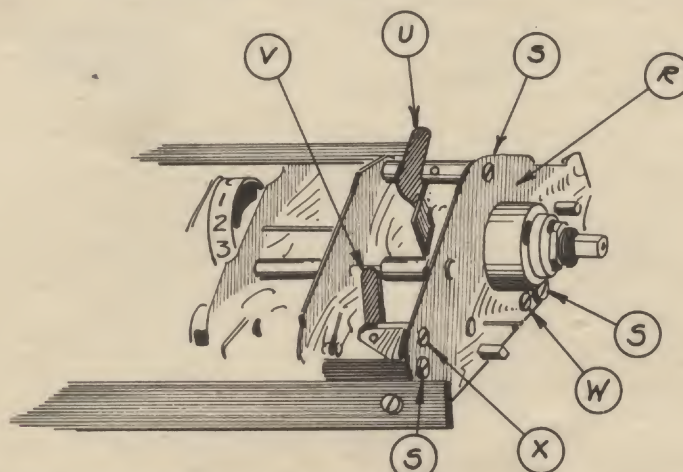
REASSEMBLING OPERATIONS-CONTINUED-FRONT CARRIAGE.



- 166 ASSEMBLE COLLAR (A) ON SQUARE SHAFT (C) (NOTE POSITION AS SHOWN) ASSEMBLE YOKE (B) ON BEARING (L) AND CONNECTING LINK TO SQUARE SHAFT (C). PLACE SPACING COLLARS (K) UPON UNIT (L) AS SHOWN; HOOK UP SPRING (D) UPON SHAFT (F) ASSEMBLE SPRING (N) ON POST (P) WITH SCREW (Q).



- 167 ASSEMBLE THE COLLAR (E) UPON SQUARE SHAFT (H) — PLACE SPRING (J) INTO GROOVE OF COLLAR (E) AND ASSEMBLE WITH SCREW (T) TIGHTEN SCREW (G) SECURELY.



- 168 ASSEMBLE PLATE (R) WITH SCREWS (S).
- 169 ASSEMBLE LEVER (U) WITH SCREW (W) INTO GROOVE ON BEARINGS (L) FROM UNDERNEATH.
- 170 ASSEMBLE LEVER (V) WITH SCREW (X) INTO GROOVE ON COLLAR (E) FROM THE TOP.
- 171 MECHANISM SHOULD BE ADJUSTED INTO BODY OF MACHINE WHILE COVER CASE IS OFF SEE PLATE 25 FOR ADJUSTMENT.
- THIS BULLETIN—



ADJUSTMENT NOTES ON FRONT CARRIAGE.

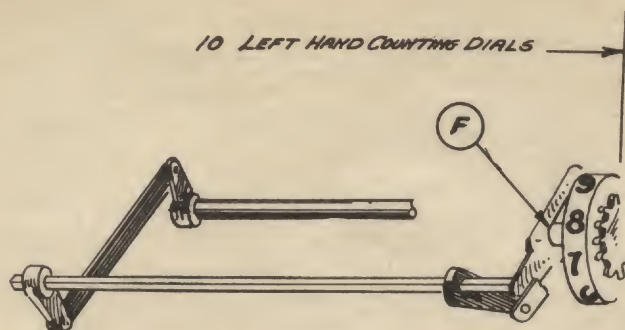


FIG. 1

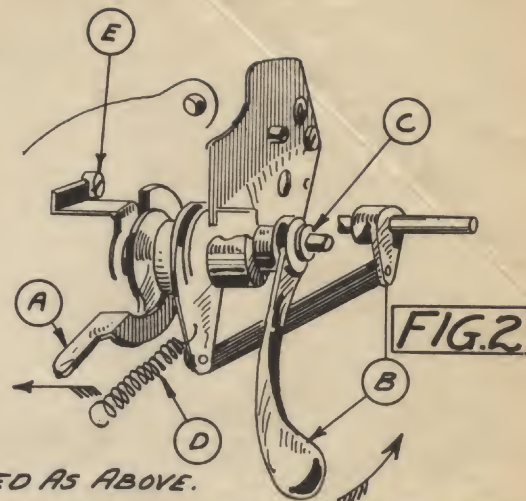
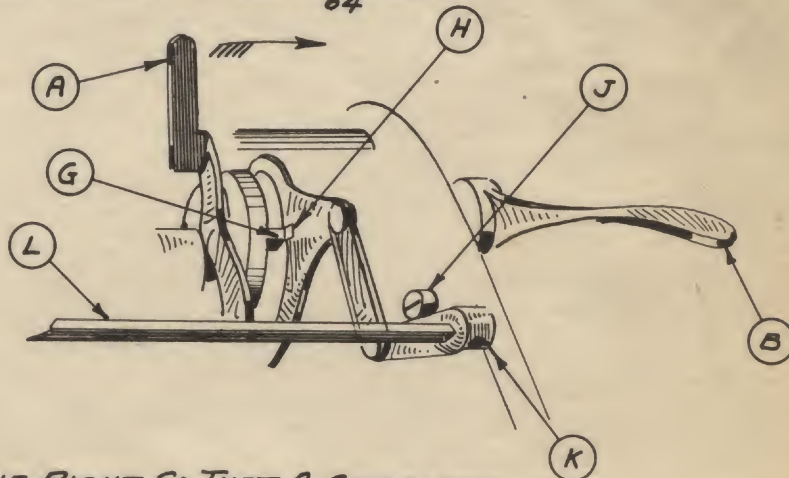


FIG. 2

- 173 THE LEFT HAND COUNTING DIALS ARE CLEARED AS ABOVE. WITH LEVER (A) AT ITS FURTHEST LEFT POSITION THE MECHANISM IS PLACED SO IT WILL CLEAR ONLY THE 10 LEFT HAND COUNTING DIALS. PLACE HANDLE (B) TEMPORARILY UPON THE SHAFT (C) AND TEST THE FUNCTIONING FOR FREEDOM OF MOTION AND NOTE THAT SPRING (D) HAS SUFFICIENT TENSION TO RETURN THE CLEAR OUT MECHANISM TO NEUTRAL.
- 174 THIS MECHANISM IS PROVIDED WITH AN ADJUSTING SCREW (E) WHICH ACTS AS A STOP AND PREVENTS THE CLEARING FINGERS FROM ADVANCING TOO FAR AND THEREBY CAUSING FRICTION UPON THE HUB OF COUNTING DIAL AT (F) WHEN THE HANDLE (B) IS IN NEUTRAL. - ADJUST FOR CLEARANCE AT THESE POINTS TO ABOUT  $\frac{1}{64}$  INCH.

FIG. 3



- 175 NOTE TO SHIFT LEVER (A) TO THE RIGHT SO THAT A COMPLETE CLEAR OUT OF THE COUNTING AND CARRYING DIALS MAY BE EFFECTED IT IS NECESSARY FOR (G) TO ENGAGE AT (H) - TO ALIGN THESE POINTS ADJUST SCREW (J) WHICH ACTS AS A STOP AGAINST (K) ON SQUARE SHAFT (L).
- 176 NOTE - AFTER THE ABOVE TWO ADJUSTMENTS HAVE BEEN MADE (FIG. 2 AND FIG. 3) - IF A BIND OCCURS IN THE RIGHT HAND SET OF DIALS; IT PROVES THAT NOT ENOUGH CLEARANCE HAS BEEN PROVIDED AT (F) - FIG. 1 - TO CORRECT, READJUST (E) AND (J) TO SUIT.



## ADJUSTMENT NOTES FRONT CARRIAGE.

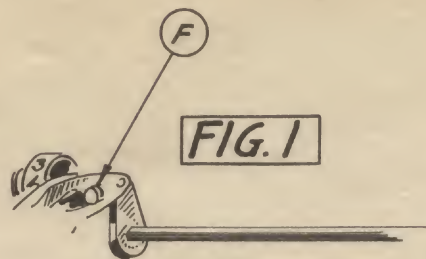


FIG. 1

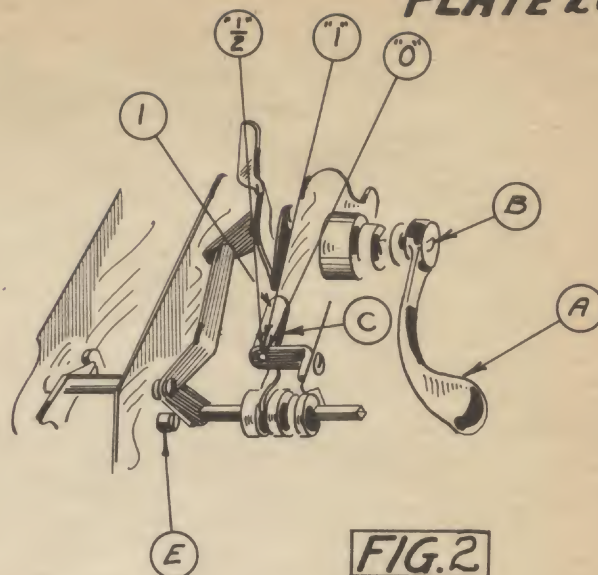
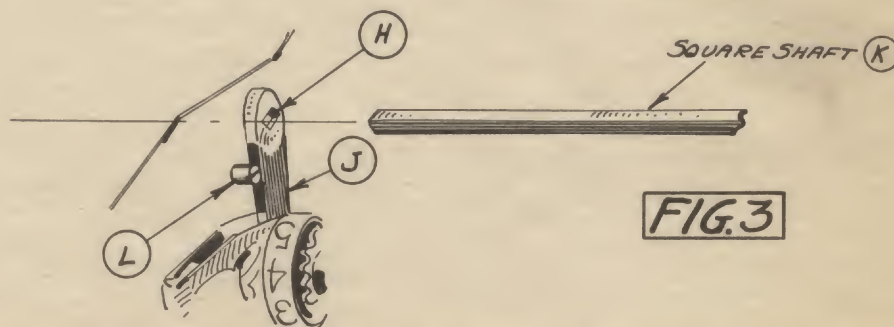


FIG. 2

- 178 PLACE HANDLE (A) UPON SHAFT (B) SET SHAFT LEVER (C) TO THE EXTREME RIGHT INTO (0) POSITION.
- 179 ADJUSTMENT (E) IS FOR THE PURPOSE OF PROVIDING CLEARANCE AT (F) BETWEEN HUB OF DIAL AND CLEARING FINGERS WHEN HANDLE (A) IS IN NEUTRAL.
- 180 TEST ALL DIALS TO SEE THAT NO BIND EXISTS.
- 181 MOVE LEVER (C) TO CENTER ('1' POSITION) IN THIS POSITION THE NINE RIGHT HAND REGISTERING DIALS WILL NOT CLEAR WHEN HANDLE (A) IS OPERATED.
- 182 MOVE LEVER (C) TO THE LEFT ( $\frac{1}{2}$  POSITION) IN THIS POSITION THE  $\frac{1}{2}$ -CENT REGISTERING DIAL CLEARS OUT TO NUMERAL '5'.



- 183 IF SHIFT LEVER (C) DOES NOT OPERATE FREELY IT IS CAUSED BY THE FACT THAT SQUARE HOLES (H) IN CLEAR FINGER LEVERS (J) DO NOT LINE UP WITH SQUARE SHAFT (K) AN ADJUSTMENT SCREW (L) IS PROVIDED TO EFFECT THIS ADJUSTMENT UPON THE LEVER THAT IS CAUSING THE BIND.



OILING INSTRUCTIONS  
FOR FRONT CARRIAGE.

FIG.1

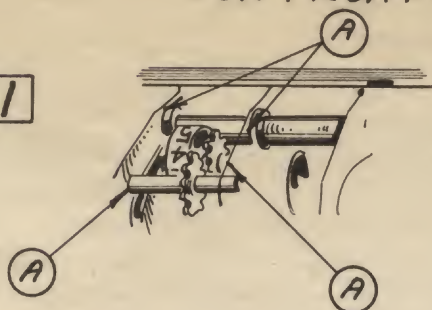
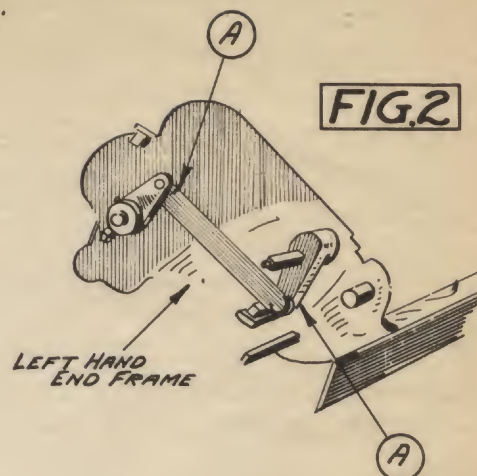


FIG.2



ALL LINK  
CONNECTIONS

FIG.3

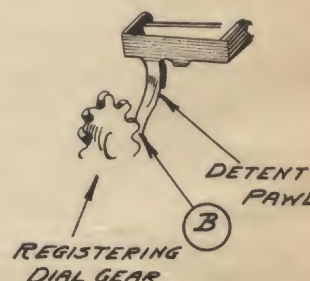
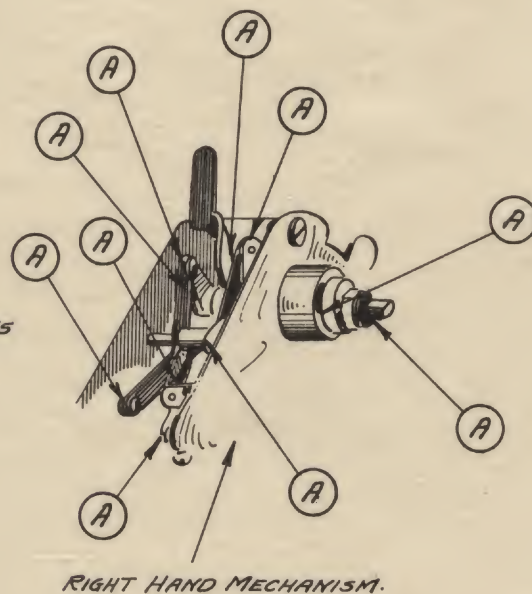


FIG.4

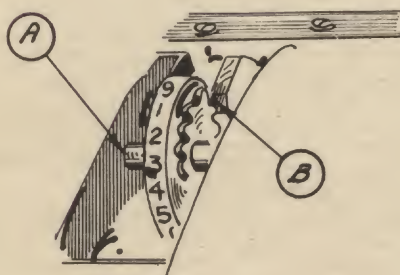


FIG.5

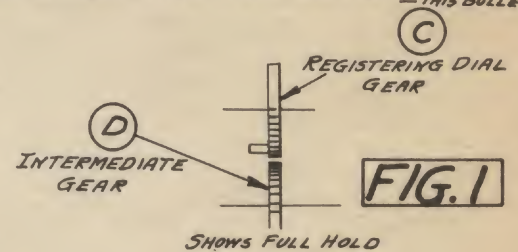
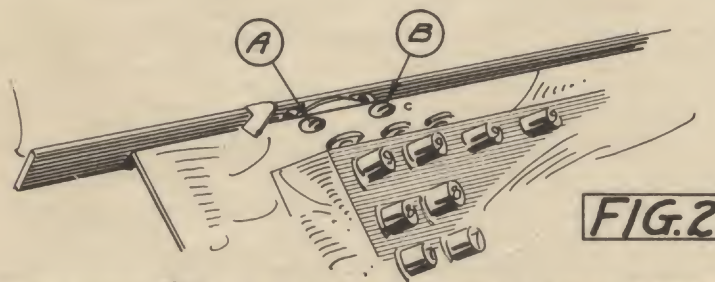
184 POINTS INDICATED AS (A) ARE TO BE  
SPARINGLY OILED WITH KIT TOOL #72  
- DO NOT USE OIL CAN -

185 POINTS INDICATED AS (B) ARE TO  
RECEIVE A SLIGHT APPLICATION OF GREASE.

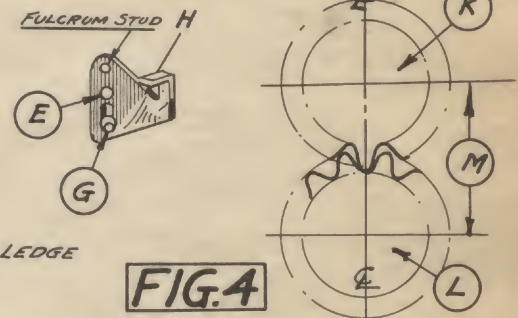
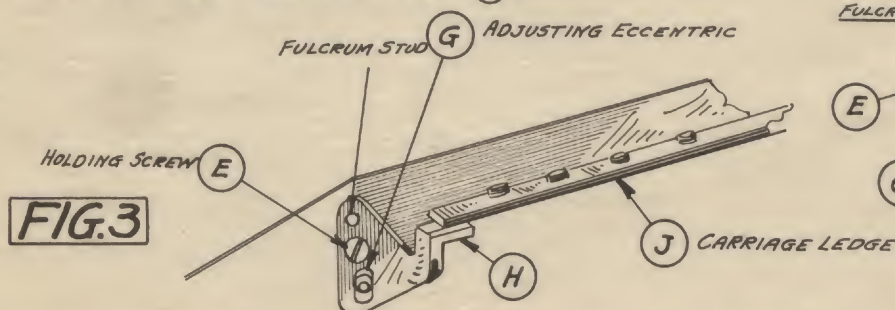


ADJUSTING THE FRONT CARRIAGE TO THE MACHINE.

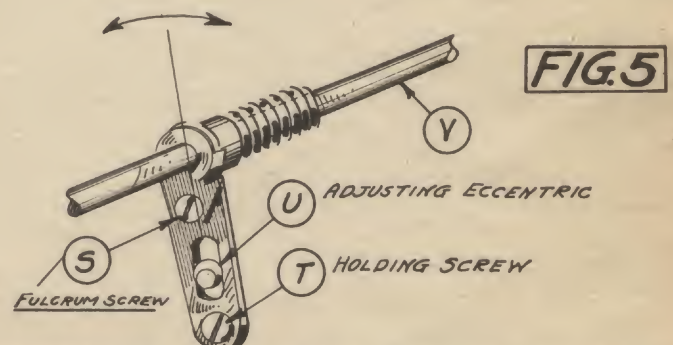
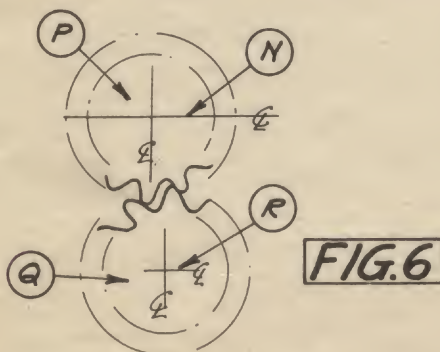
- 186 IMPORTANT - THE FRONT CARRIAGE MUST BE ASSEMBLED AND ADJUSTED COMPLETELY BEFORE THE REAR CARRIAGE IS ASSEMBLED AND ADJUSTED.
- 187 FOR ASSEMBLING THE COMPLETE CARRIAGES TO MACHINE SEE PLATE 66 - THIS BULLETIN.
- 188 TO ADJUST THE SIDE-WISE ALIGNMENT OF THE REGISTERING DIAL GEARS WITH THE INTERMEDIATE GEARS IT IS NECESSARY TO REMOVE THE CARRIAGE COVER CASE SEE PLATE 11-12 - THIS BULLETIN. THIS WILL PERMIT A VISUAL INSPECTION.



- 189 ADJUST SCREW (A) UNTIL A SLIGHT PLAY EXISTS BETWEEN THE ROLLERS ON THE SHIFTER YOKE AND THEIR BEARINGS IN THE LOCK LEDGE.
- 190 LOOSEN SCREW (B) CONTROLLING THE SIDEWISE ADJUSTMENT OF THE CARRIAGE AND TAP SIDEWISE UNTIL THE REGISTERING DIAL GEARS (C) ALIGN WITH THE INTERMEDIATE GEARS (D) AS SHOWN IN FIG. 1 THEN TIGHTEN SCREW (B).



- 191 THE HEIGHT OF ARMS (H) DETERMINE THE UP AND DOWN (M) MESHING OF GEARS (K) AND (L) TO ADJUST - ECCENTRICS (G) ARE PROVIDED.



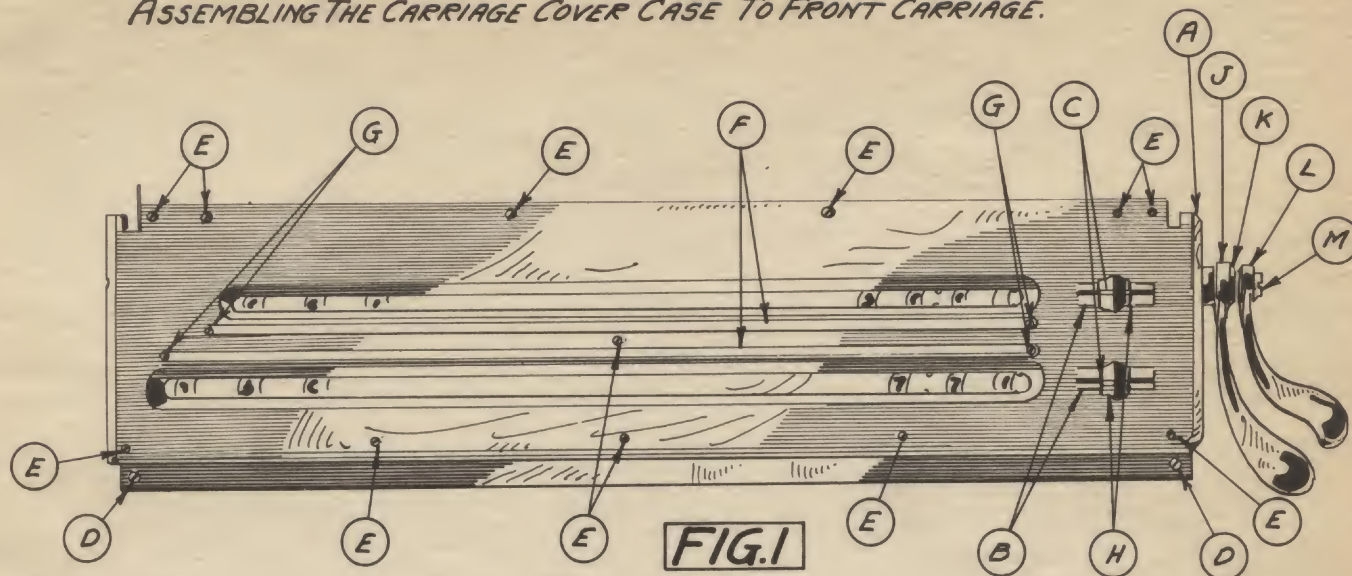
- 192 TO ADJUST THE CARRIAGE FORWARD OR REARWARD TO EFFECT THE CENTRALIZING OF GEARS (N) WITH (Q), ECCENTRICS (U) ARE PROVIDED.
- 193 THE COMBINATION OF THESE TWO ADJUSTMENTS (FIG. 3-4-5-6) IS NECESSARY TO ACCOMPLISH THE FINAL ADJUSTMENT.

FOR ADJUSTMENT OF CARRIAGE LOCK LATCHES SEE PLATE 9 OPERATION

-THIS BULLETIN-



ASSEMBLING THE CARRIAGE COVER CASE TO FRONT CARRIAGE.



195 ASSEMBLE CASE (A) THIS CASE IS PROVIDED WITH ENLARGED SLOTS (B) SO THAT IT MAY BE EASILY SLIPPED OVER THE SHIFT HANDLES (C) FASTEN WITH SCREWS (D).

196 FASTEN WINDOW FRAME TO CASE WITH SCREWS (E).

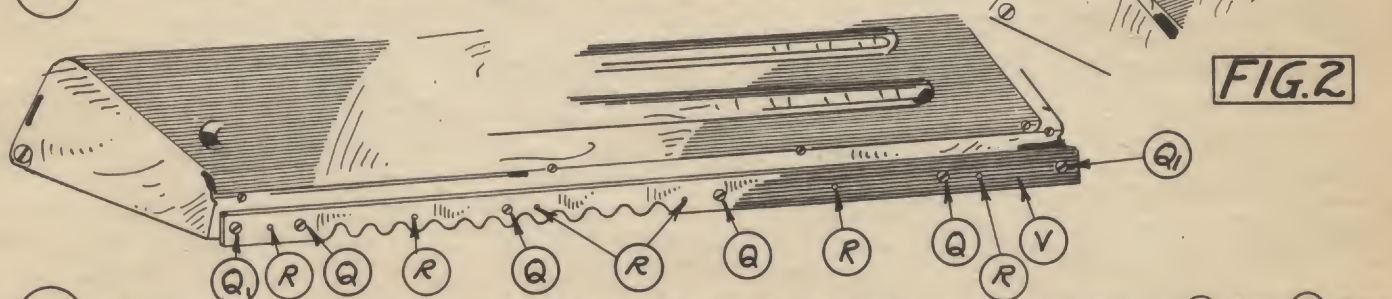
197 ASSEMBLE DECIMAL POINT RODS (F) WITH SCREWS (G).

198 ASSEMBLE THE SHIFT LEVER KNOBS (H) WITH THE SCREWS THAT HOLD THEM.

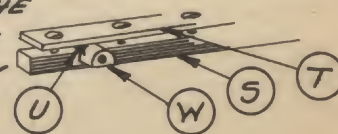
199 ASSEMBLE HANDLE (J) AND FASTEN NUT (K) WITH KIT TOOL # 52.

200 ASSEMBLE HANDLE (L) AND FASTEN WITH SCREW (M).

201 HOOK UP THE TWO SPRINGS (N) TO REAR CARRIAGE LEDGE (P).



202 NOTE - CARRIAGE LOCK LEDGE MAY BE REMOVED BY TAKING OUT SCREWS (Q) AND (Q1) AND LIFTING LEDGE (V) FROM DOWELS (R) TO REASSEMBLE - PLACE THE FOUR COLLARS (W) UPON SQUARE BAR (S) WITH LUG (U) BETWEEN THE RAIL (T) AND BAR (S) IN POSITION FOR SCREWS (Q) ONLY AND FASTEN WITH SCREWS (Q) AND (Q1)





NOTES ON DISMANTLING BASE OF MACHINE.

- 204 REMOVE REAR COVER PLATE (A) BY TAKING OUT SCREWS (B) AS SHOWN.

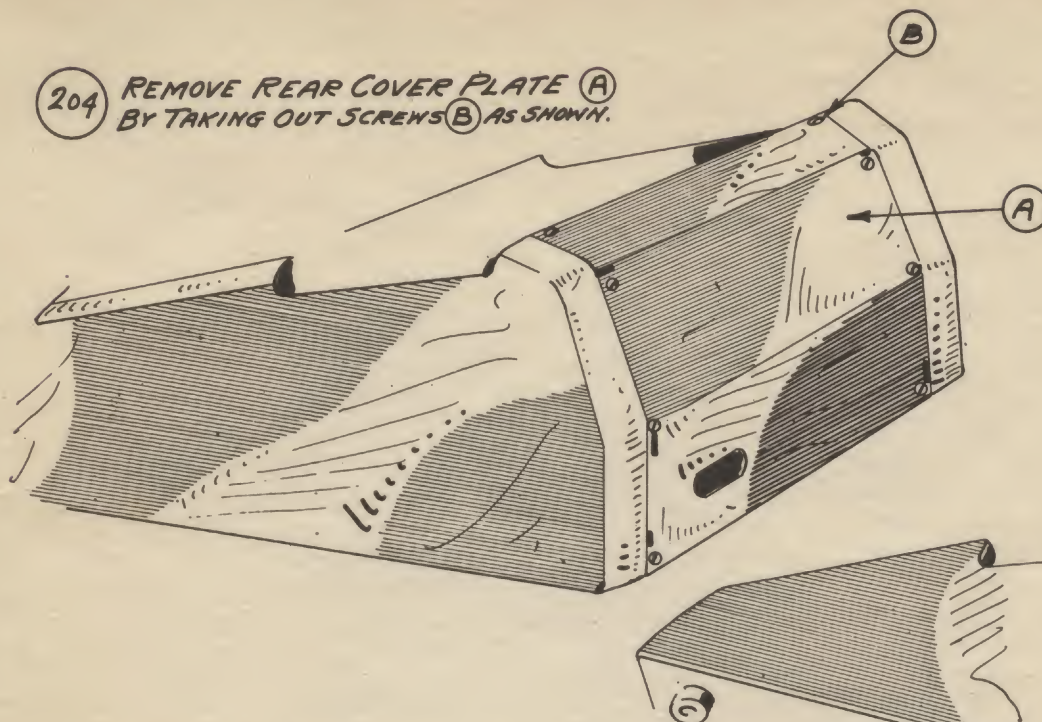


FIG. 1

- 205 REMOVE THE TWO MOTOR BOLTS (C) WITH KIT TOOL #9 AND LAY BOLTS AND LOCK WASHERS ASIDE.

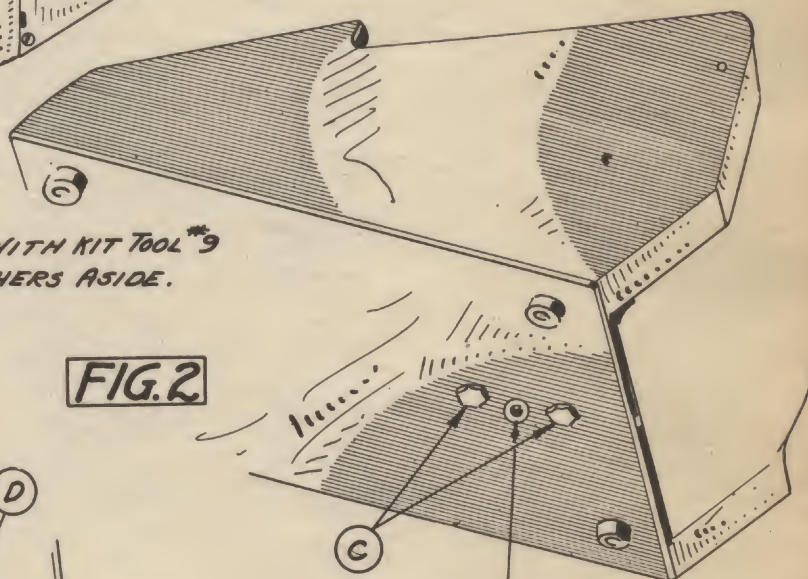


FIG. 2

206

POWER UNIT IS SELF-CONTAINED AND COMPLETE. CONTACTS, PLUG CONNECTOR, RESISTOR AND CONDENSER ARE ON ONE FRAME.

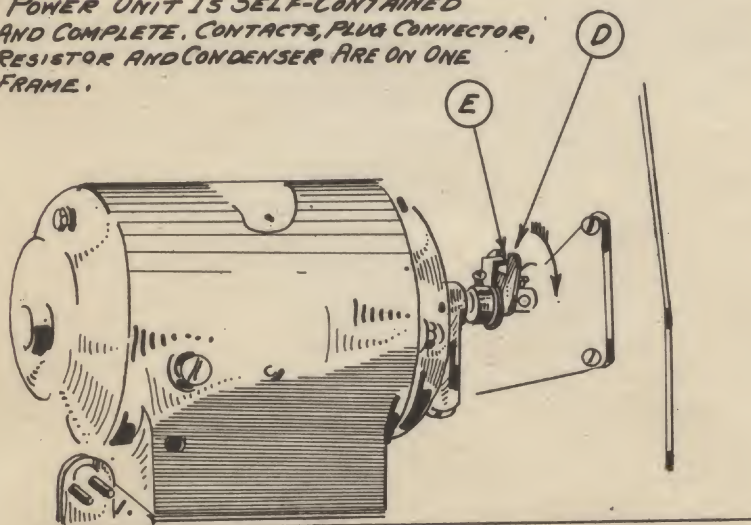


FIG. 3

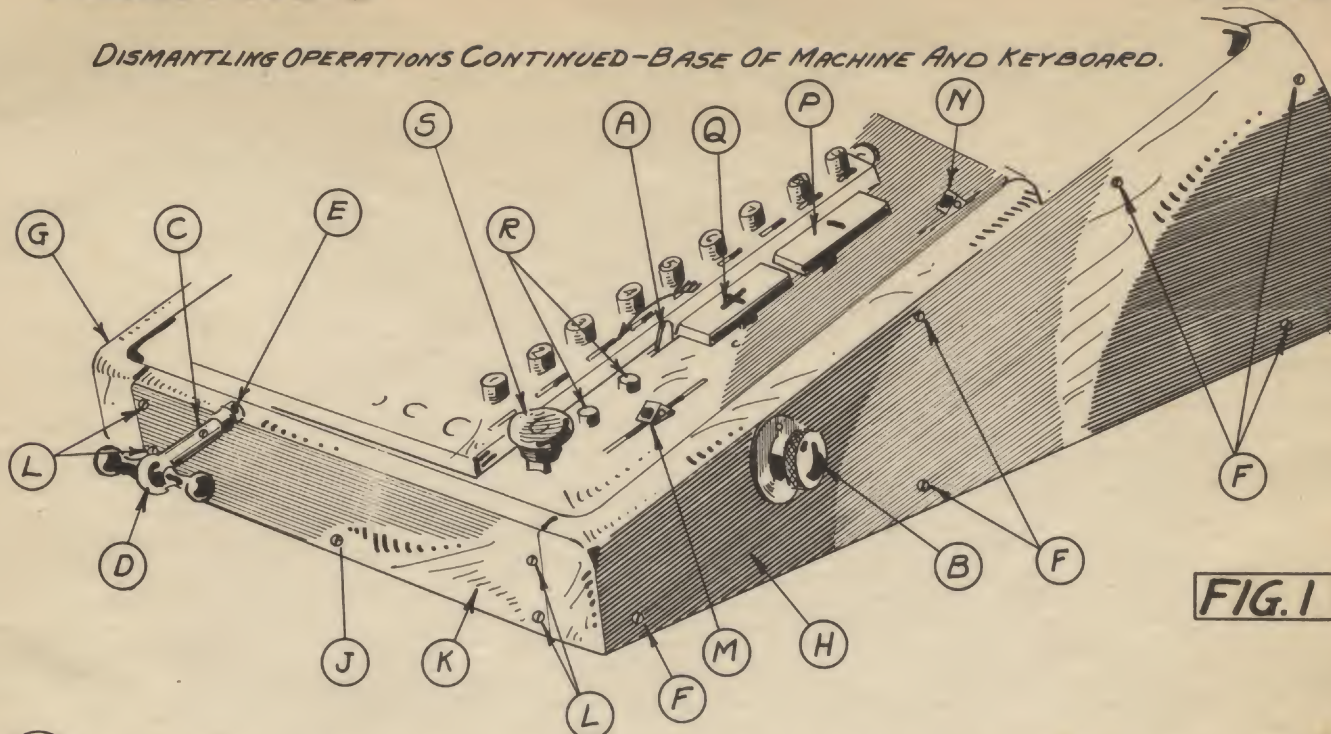
- 207 REVOLVE ARM (D) UNTIL SLOT (E) FACES REAR OF MACHINE - POWER UNIT MAY BE EASILY EXTRACTED AND LAID ASIDE.

- 208 SEE PLATE 64 FOR DETAIL NOTES OF POWER UNIT.

- THIS BULLETIN -



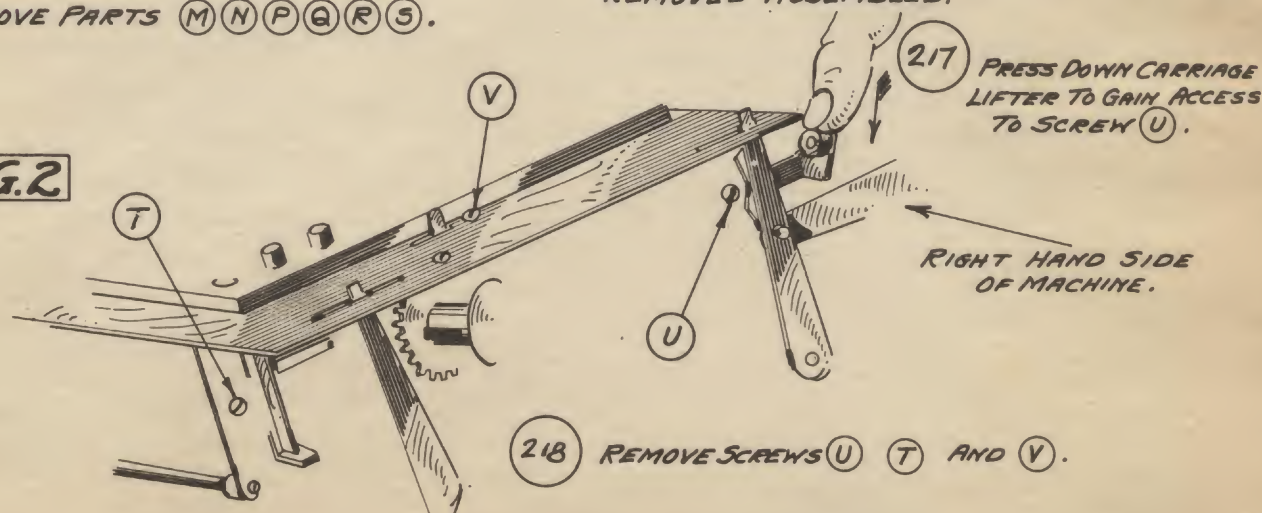
DISMANTLING OPERATIONS CONTINUED—BASE OF MACHINE AND KEYBOARD.



**FIG. 1**

- 210 MOVE LEVER (A) IN DIRECTION OF ARROW AND EXTRACT COVER PLUG (B).
- 211 REMOVE SCREW (C) AND TAKE OFF SHIFTER HANDLE (D)—NOTE—DO NOT LOSE COLLAR (E).
- 212 REMOVE THE SCREWS (F) ON RIGHT AND LEFT HAND SIDE PLATES (G—H).
- 213 REMOVE SCREW (J) FROM FRONT PLATE (K).
- 214 CASE MAY NOW BE WITHDRAWN FROM THE BASE OF THE MACHINE.
- 215 NOTE—THE RIGHT, LEFT OR FRONT SECTION OF THE CASE MAY BE REMOVED SEPARATELY IF DESIRED. BUT THE ENTIRE CASE CAN NOT BE REMOVED ASSEMBLED.
- 216 REMOVE PARTS (M—N—P—Q—R—S).

**FIG. 2**

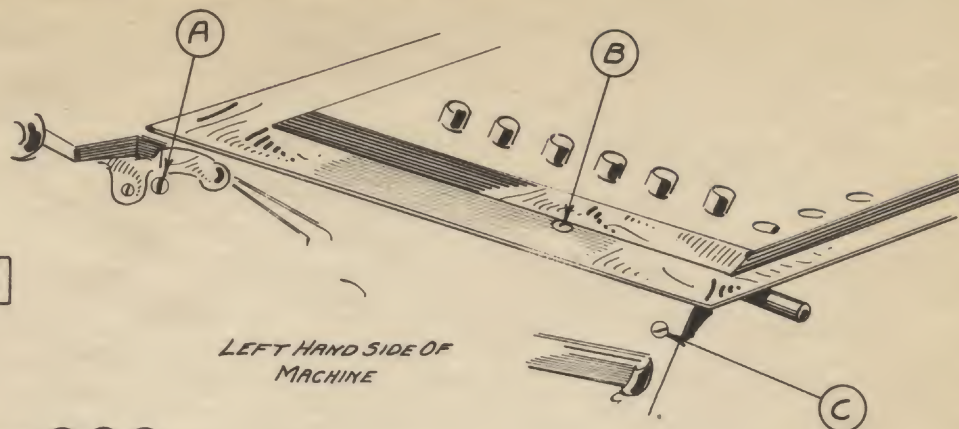


- 217 PRESS DOWN CARRIAGE LIFTER TO GAIN ACCESS TO SCREW (U).
- 218 REMOVE SCREWS (U) (T) AND (V).

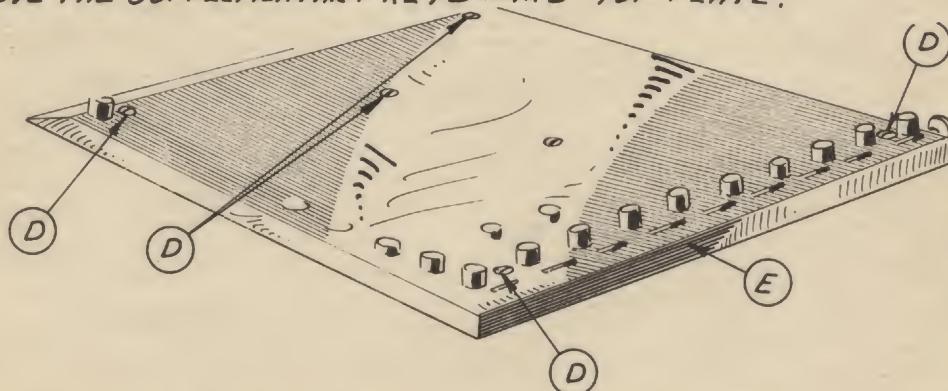


## DISMANTLING OPERATIONS ON KEYBOARD.

**FIG. 1**

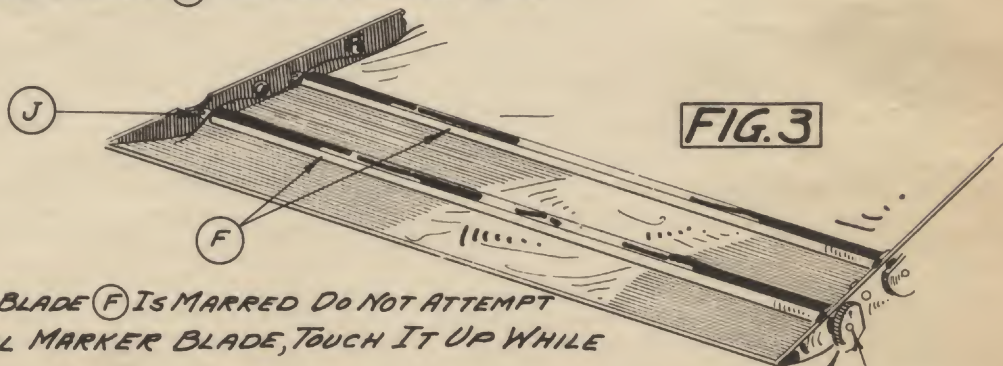


- (219) REMOVE SCREWS (A) (B) (C).  
BE SURE THAT ALL 'O' KEYS ARE DOWN: KEYBOARD ASSEMBLY MAY NOW BE REMOVED BY PUSHING IT SLIGHTLY TO REAR AND EXTRACTING IT FROM MACHINE.
- (220) REMOVE THE CARRIAGE SHIFTER - SEE PLATE 17 BULLETIN 34 OPERATION (112).
- (221) REMOVE THE SUPPLEMENTARY KEYBOARD TOP PLATE.



**FIG. 2**

- (222) REMOVE SCREWS (D) AND PLATE (E) MAY BE LIFTED OFF.



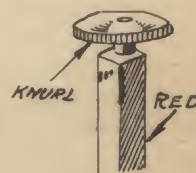
**FIG. 3**

- (223) NOTES- IF ENAMEL ON BLADE (F) IS MARRED DO NOT ATTEMPT TO REMOVE THE DECIMAL MARKER BLADE, TOUCH IT UP WHILE ASSEMBLED.

IF BLADE IS TO BE REMOVED FILE OFF RIVET HEAD (G) PRY OFF KNOB (H) REMOVE SCREW (J) AND LIFT OUT BLADE (F).

TO REASSEMBLE INSERT BLADE (F) INTO PLACE-INSERT SCREW (J) AND HOLD (J) UPON LEAD ANVIL KIT TOOL \*55 AND RE-RIVET.

- (224) NOTE POSITION OF KNURL ON KNOB (H) BEFORE RIVETING.

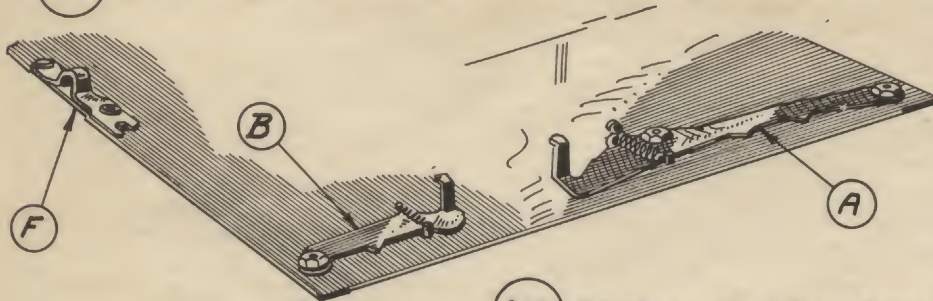




## NOTES ON DISMANTLING OF THE KEYBOARD

225 REMOVE KEY TOPS - SEE PLATE 17 BULLETIN 34 OPERATION 113.

226 REMOVE KEYBOARD TOP PLATE (10 SCREWS WILL BE FOUND HOLDING TOP PLATE DOWN).



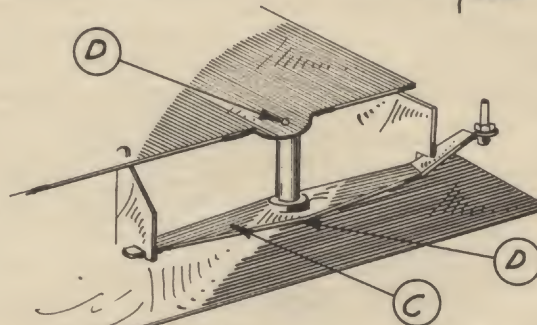
**FIG. 1**

227 IF NECESSARY LOCK LEVERS (A) AND (B) MAY BE REMOVED BY TAKING OFF RESPECTIVE LOCK COLLAR NUTS AND SPRINGS.

228 NOTE - IN REASSEMBLING TEST FOR FREEDOM OF MOTION AND SEE THAT SPRINGS HAVE PROPER TENSION.

229 IF NECESSARY TO REMOVE THE CARRIAGE SHIFTER STRAP (F). (SEE 116 PLATE 17 BULLETIN 34) (SEE 117 PLATE 18 BULLETIN 34)

**FIG. 2**



230 IF NECESSARY TO REMOVE THE LOCK BAR LEVER (C) SPRING IT OUT OF POINTS (D), TO REASSEMBLE IT SNAP IT BACK INTO PLACE AS SHOWN ABOVE.

231 FURTHER KEYBOARD DISMANTLING OPERATIONS CLOSELY FOLLOW METHODS SHOWN AND ANALYZED ON PLATES 18 AND 19 BULLETIN 34 - TO ASSEMBLE SEE PLATE 58-59-60-61 BULLETIN 34.

232 NOTE - ON THIS MACHINE - INSTEAD OF USING INDIVIDUAL KEY STEM UPSTOP WASHERS - PLATES (E) EMBRACING FIVE KEY STEMS ARE USED.

FELTS MAY BE TAKEN OUT AND REPLACED INDIVIDUALLY BY REMOVING ONLY THE KEY STEM UPON WHICH IT IS ASSEMBLED.

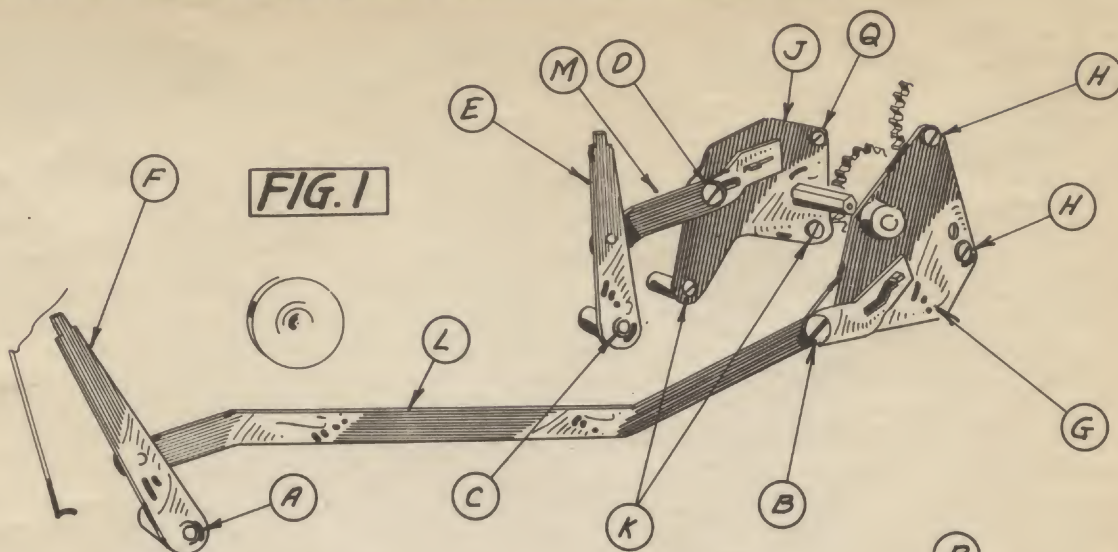
**FIG. 3**



CLEARANCE SLOT FOR RELEASE BAR.



## DISMANTLING OPERATIONS RIGHT HAND SIDE FRAME PARTS.



233 REMOVE RETAINING RING (A) AND SCREW (B) AND REMOVE SHIFT LEVER (F) AND LINK (L).

234 REMOVE RETAINING RING (C) AND SCREW (D) AND REMOVE SHIFT LEVER (E) AND LINK (M).

235 REMOVE SCREW (N) AND WITHDRAW FORK (P) REMOVE SCREWS (H) AND REMOVE PLATE (G).

236 REMOVE RETAINING RING (Q) - REMOVE SCREW (R)  
- REMOVE SCREWS (K) - REMOVE PLATE (J) AND YOKE (S).

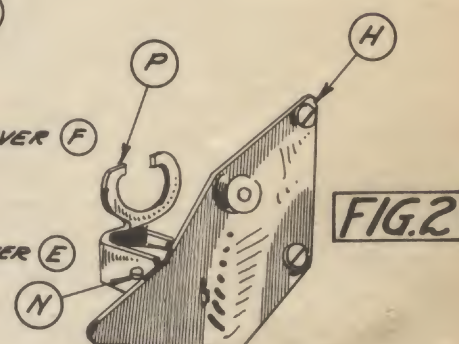
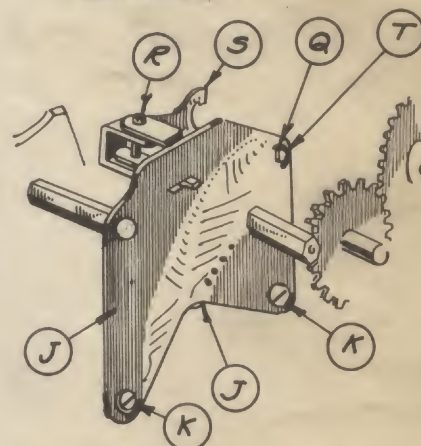
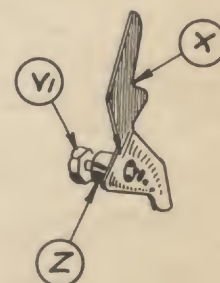
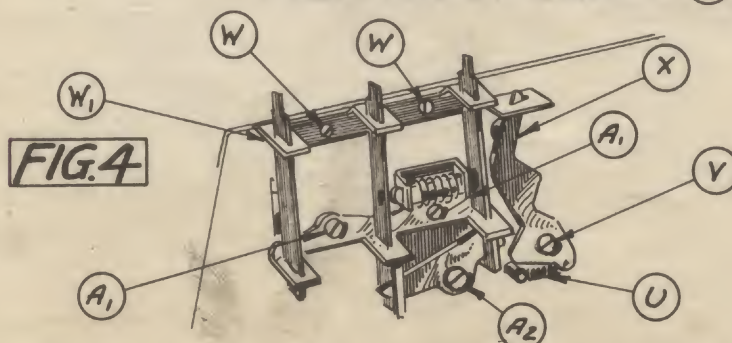


FIG. 3



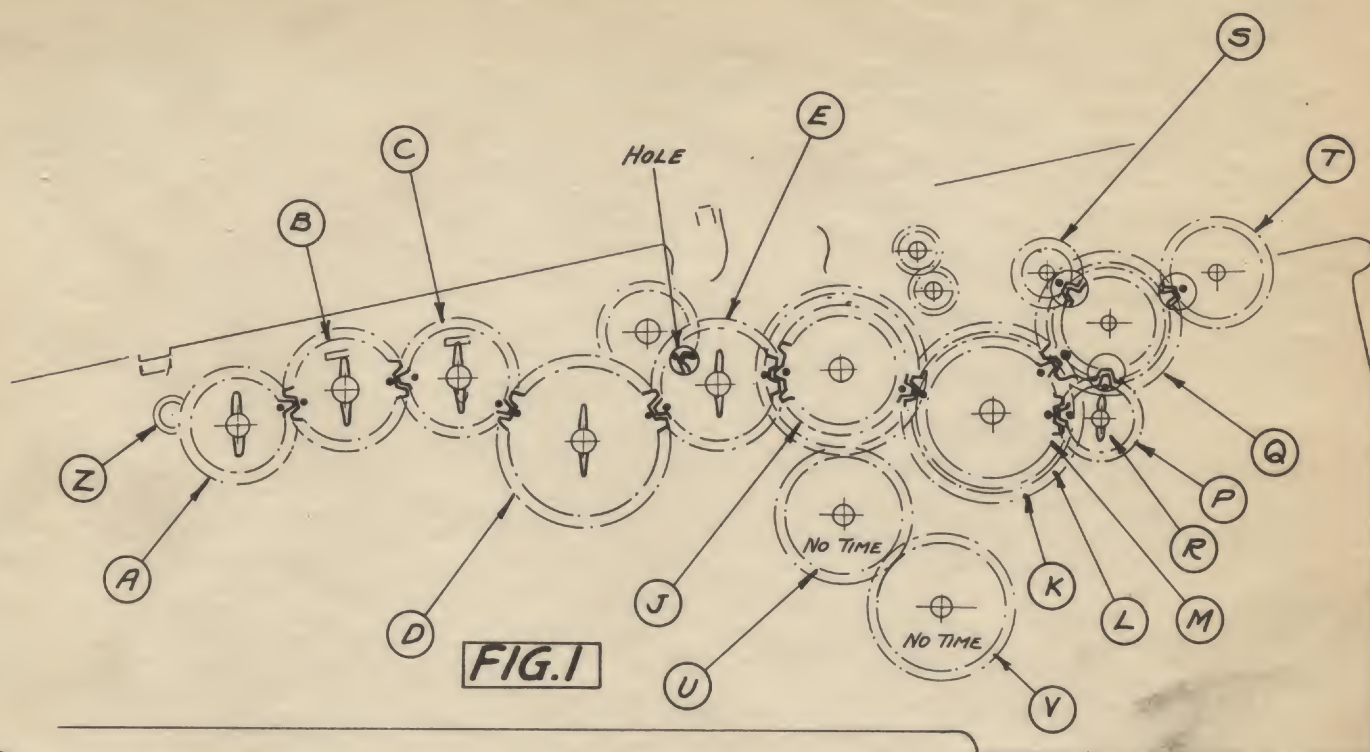
237 NOTE IN REMOVING PLATE (J)  
DO NOT DISTURB  
POSITION OF SHAFT (T).



238 UNHOOK SPRING (U) REMOVE SCREW (Y) LIFT OFF RELEASE LEVER (X) TOGETHER WITH COLLAR (Z) AND NUT (V1) - REMOVE SCREW (W) AND BLANK (W1) REMOVE SCREWS (A1) AND (A2). (A2) IS SUPPLIED WITH A NUT.  
- REMOVE REMAINDER OF KEY ASSEMBLY AND LAY ASIDE.



DISMANTLING OPERATIONS ON RIGHT HAND SIDE FRAME.



239 REMOVE RETAINING CLIPS ON (A) (B) (C) (D) (E).

240 UNHOOK SPRING (G) AND REMOVE ECCENTRIC NUT (AA).  
REMOVE LEVER (F) AND LAY PARTS ASIDE.

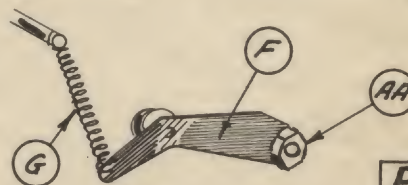


FIG. 2

241 REMOVE GEARS (A) (B) (C) (D) (E).

242 REMOVE COLLAR (Z) AND LAY ASIDE.

243 REMOVE GEAR (K) WITH CLUTCH COLLAR BEHIND IT.

244 UNHOOK SPRING (H) AND REMOVE SCREW (W) NUT (X)  
AND LEVER (X<sub>1</sub>).

245 REMOVE GEAR (Q).

246 REMOVE CLIP (R) AND REMOVE GEAR (P).

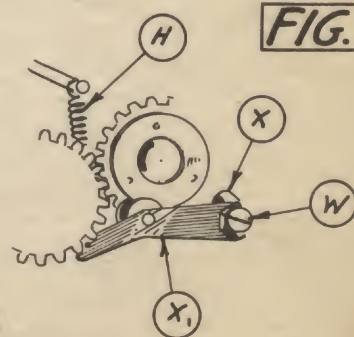
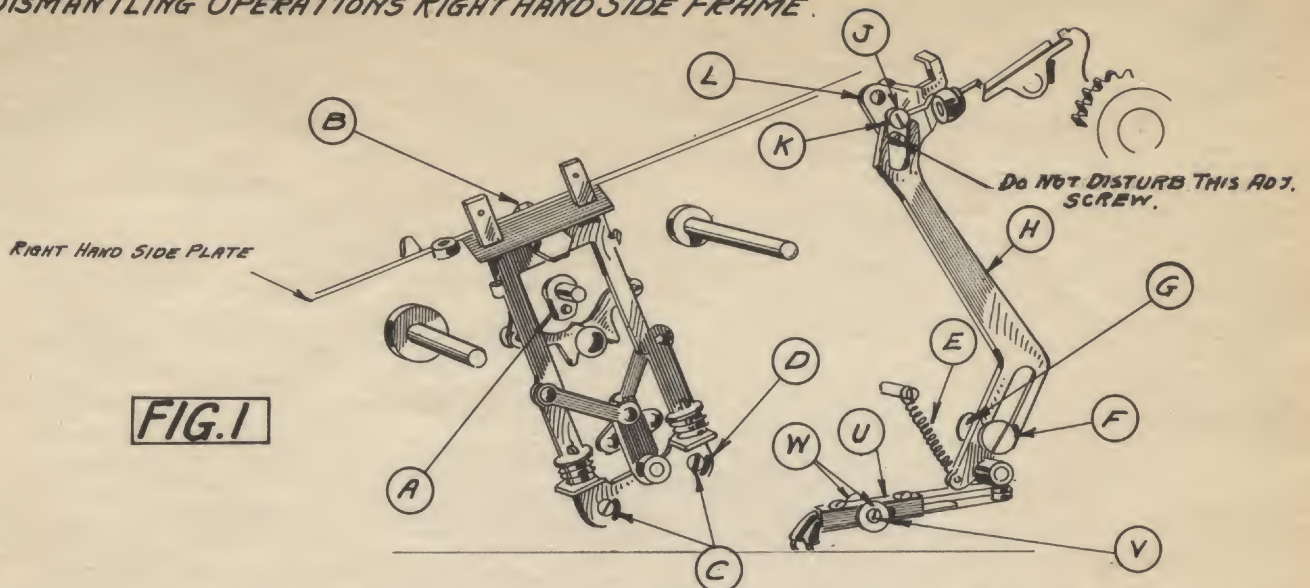


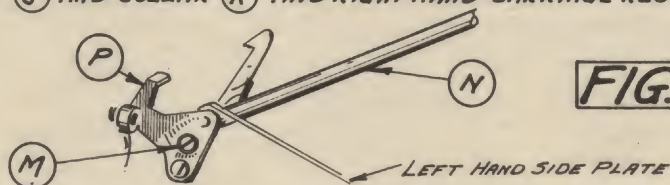
FIG. 3



## DISMANTLING OPERATIONS RIGHT HAND SIDE FRAME.



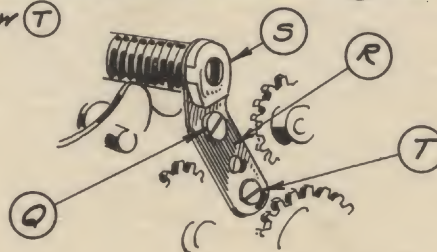
- (247) REMOVE CAM (A) AND LAY ASIDE-UNSCREW NUT (B)-TAKE OUT SCREWS (C) IN BRACKET (D) AND LAY ASSOCIATED PARTS ASIDE.
- (248) UNHOOK SPRING (E)-REMOVE SCREW (F) AND COLLAR (G)-TAKE OFF ARM (H).
- (249) REMOVE THE SWITCH (U) BY TAKING OUT SCREW (V)-DO NOT LOSE WASHERS (W).
- (250) REMOVE SCREW (J) AND COLLAR (K) AND RIGHT HAND CARRIAGE REST ARM (L) MAY BE REMOVED.



- (251) REMOVE SCREW (M) AND TAKE SHAFT (N) OUT OF MACHINE REMOVE CARRIAGE REST (P) AND LAY ASIDE.

- (252) REMOVE THE RIGHT HAND FRONT CARRIAGE HINGE ROD SUPPORT ARM (R)-REMOVE SCREW (Q) AND TAKE OFF FELT AND RETAINER (S)-REMOVE SCREW (T) AND PART (R) MAY BE TAKEN OFF.

FIG. 3



- (253) REMOVE THE BOTTOM PAN BY REMOVING THE FOUR FEET AND TAKING THE SIX HOLDING SCREWS OUT - PUT FEET ON TO BASE OF MACHINE AGAIN FOR CONVENIENCE.



DISMANTLING OPERATIONS LEFT HAND SIDE FRAME PARTS.

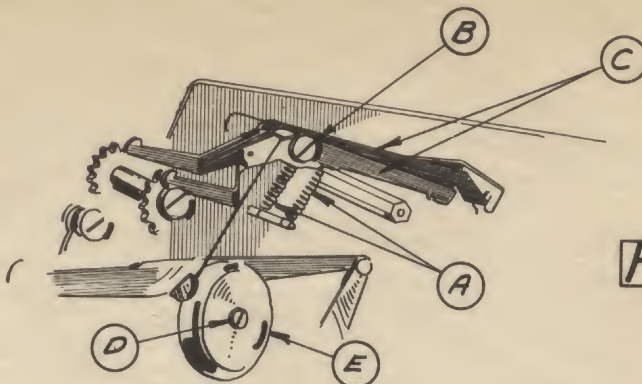


FIG. 1

254 UNHOOK SPRINGS (A) - REMOVE SCREW (B) - OVERCARRY TRIP LEVER AND FLEXIBLE END (C) MAY BE REMOVED AND LAID ASIDE.

255 REMOVE SCREW (D) AND BELL (E) AND LAY ASIDE.

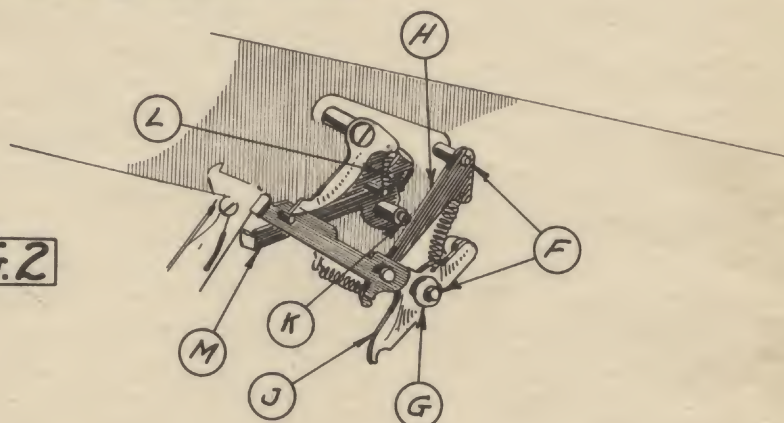


FIG. 2

256 REMOVE RETAINING RINGS (F) AND WASHER (G) - REMOVE MACHINE LOCATOR ARM (J) AND LIFTER (H) AND LAY ASIDE.

257 UNHOOK SPRING (L) AND RETAINING RING (K) - REMOVE QUICK STROKE LATCH (M).

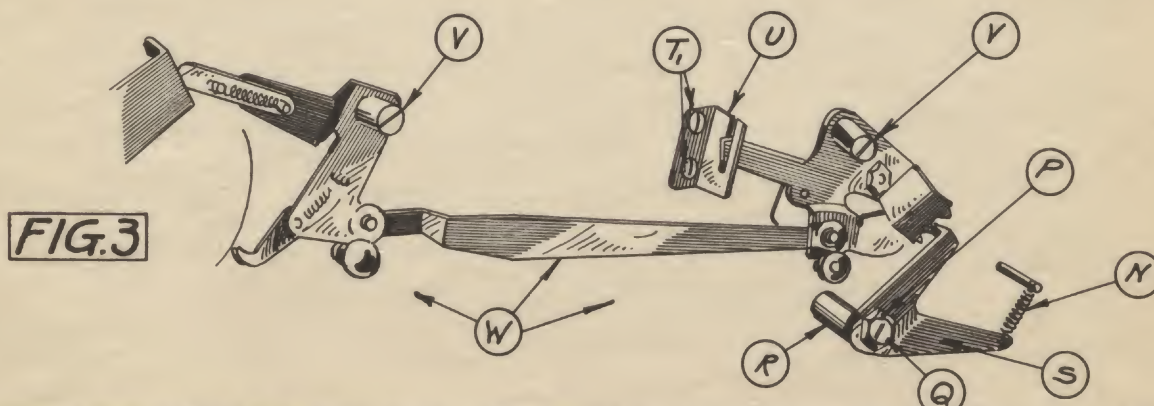


FIG. 3

258 UNHOOK SPRING (N) - TAKE OUT SCREW (Q) AND LAY ECCENTRIC COLLAR (P), CLICK (S) AND SPACING COLLAR (R) ASIDE - REMOVE SCREWS (T) AND GUIDE BLANK (U) - REMOVE SCREWS (V) AND PARTS (W) MAY BE TAKEN OFF.



DISMANTLING OPERATIONS LEFT HAND SIDE FRAME PARTS.

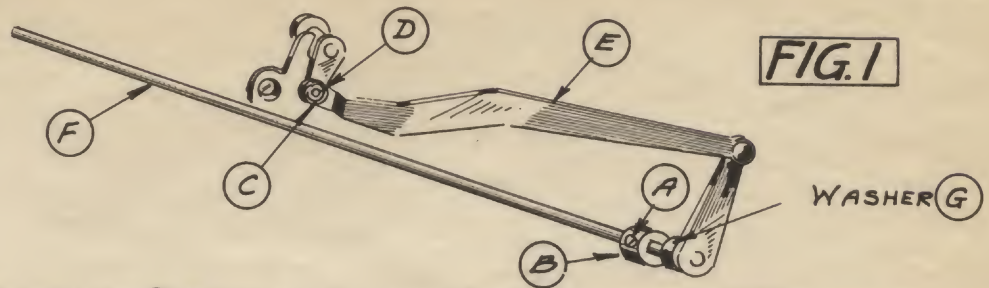
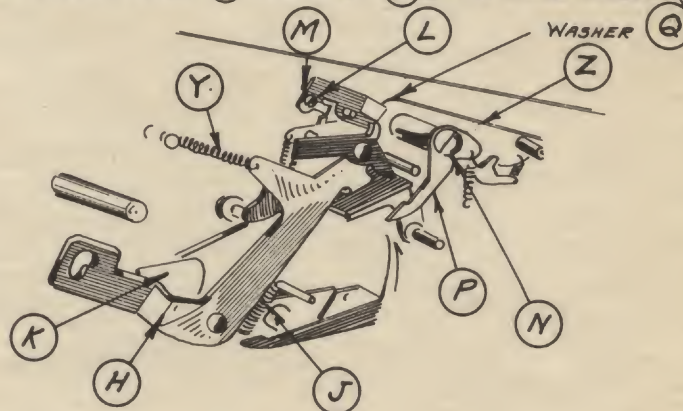


FIG. 1

- 259 LOOSEN SCREW (A) ON COLLAR (B) FOUND ON INNER SIDE OF LEFT HAND FRAME-REMOVE RETAINING RING (C) AND WASHER (D) AND EXTRACT ROCK LEVER (E) AND SHAFT (F) DO NOT LOSE COLLAR (B) AND WASHER (G).

FIG. 2



- 260 UNHOOK SPRING (Y) AND REMOVE CYCLE STOPPING ARM (H).  
UNHOOK SPRING (J) AND REMOVE BLANK (K).  
REMOVE SCREW (L) AND GUIDE BLANK (M).  
REMOVE SCREW (N) AND TAKE OFF MACHINE STOPPING LEVER (Z) WITH LATCH (P) AND WASHER (Q).

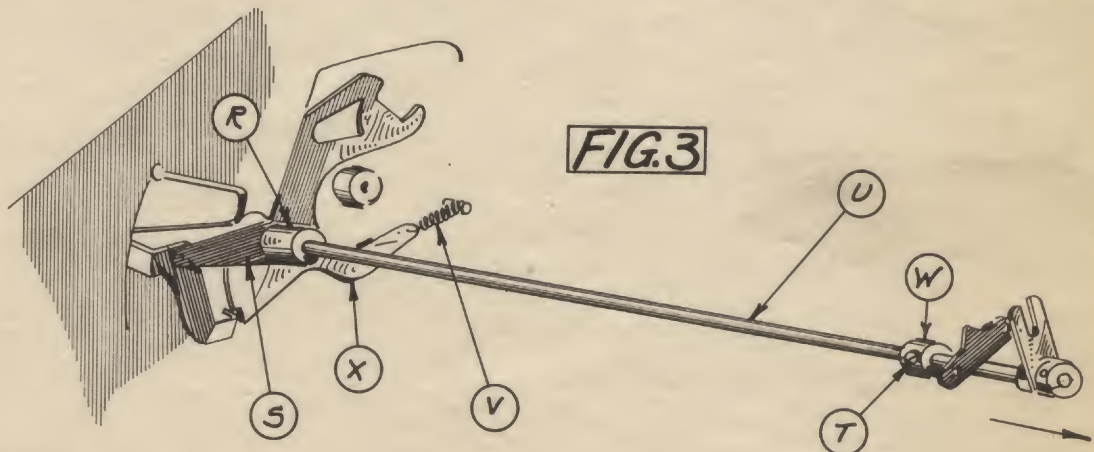


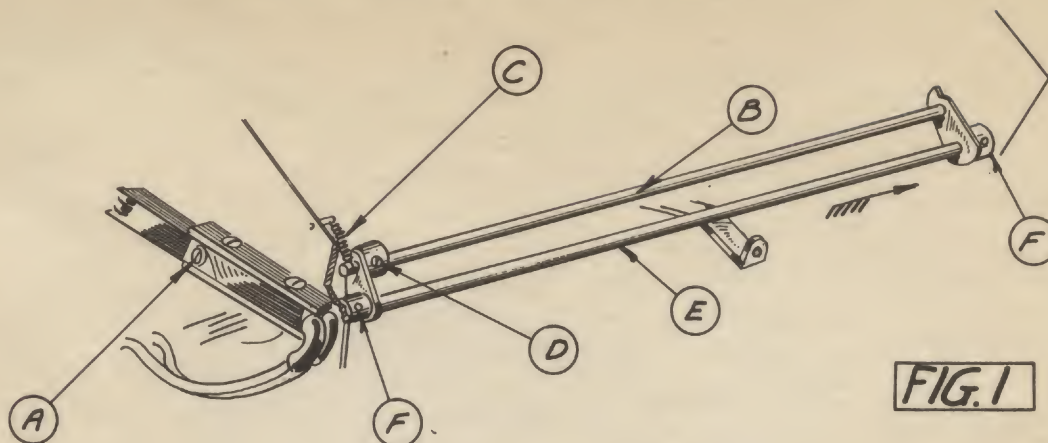
FIG. 3

- 261 DRIVE OUT PIN (R).  
LOOSEN SCREW (T) IN COLLAR (W)-PULL OUT SHAFT (U) IN DIRECTION OF ARROW UNTIL UNIT (S) IS FREE AND MAY BE REMOVED.

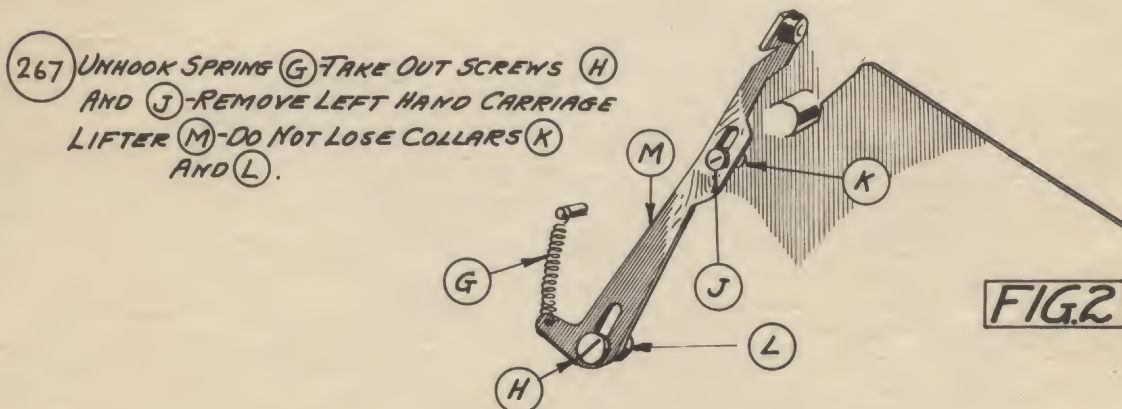
- 262 TAKE OUT SHAFT (U) AND COLLAR (W).  
UNHOOK SPRING (V) AND REMOVE POSITIONER (X).



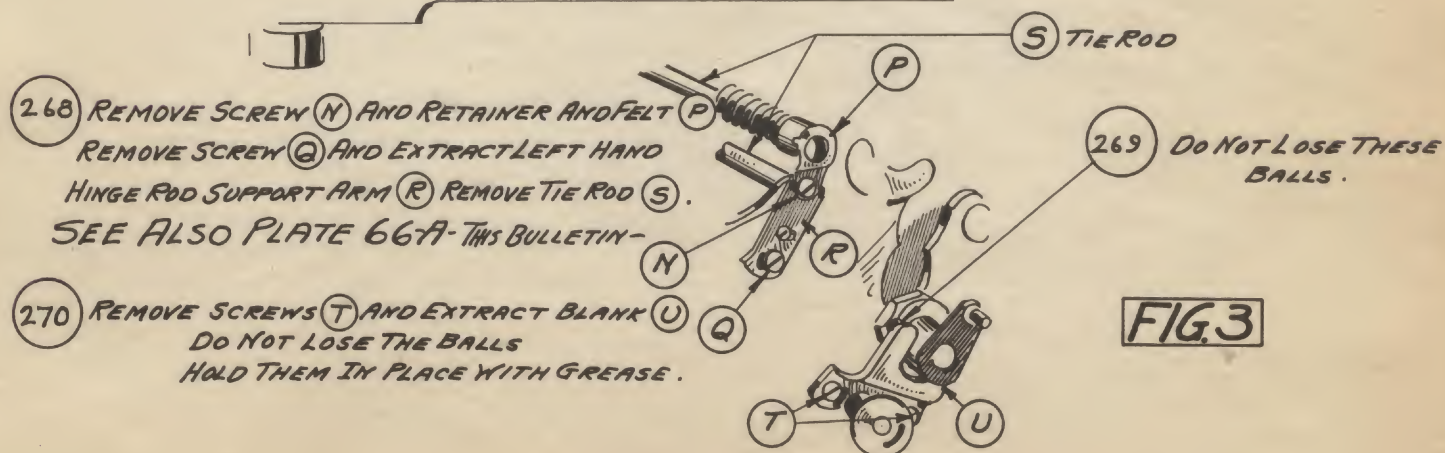
## DISMANTLING OPERATIONS ON BASE OF MACHINE.



- 263 SWITCH MAY BE REMOVED BY LOOSENING SCREW (A).
- 264 TO REMOVE SHAFT (B) UNHOOK SPRING (C) AND LOOSEN SCREW (D) AND EXTRACT.
- 265 TO REMOVE SHAFT (E) DRIVE OUT BOTH PINS (F) AND EXTRACT THROUGH FRAMES.
- 266 REMOVE THE HAND CUT-OUT MECHANISM AS PER PLATE 34 <sup>#</sup> (237A) BULLETIN <sup>#</sup> 34.



- 267 UNHOOK SPRING (G) TAKE OUT SCREWS (H) AND (J) REMOVE LEFT HAND CARRIAGE LIFTER (M) DO NOT LOSE COLLARS (K) AND (L).



- 268 REMOVE SCREW (N) AND RETAINER AND FELT (P) REMOVE SCREW (Q) AND EXTRACT LEFT HAND HINGE ROD SUPPORT ARM (R) REMOVE TIE ROD (S). SEE ALSO PLATE 66A-THIS BULLETIN-
- 269 DO NOT LOSE THESE BALLS.
- 270 REMOVE SCREWS (T) AND EXTRACT BLANK (U) DO NOT LOSE THE BALLS HOLD THEM IN PLACE WITH GREASE.

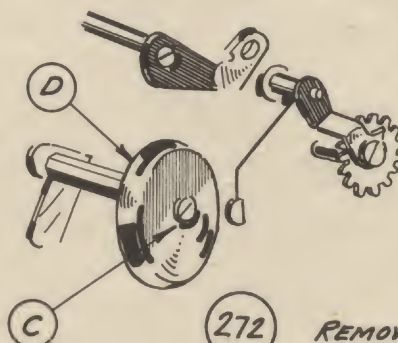


## DISMANTLING OPERATIONS LEFT HAND SIDE FRAME.



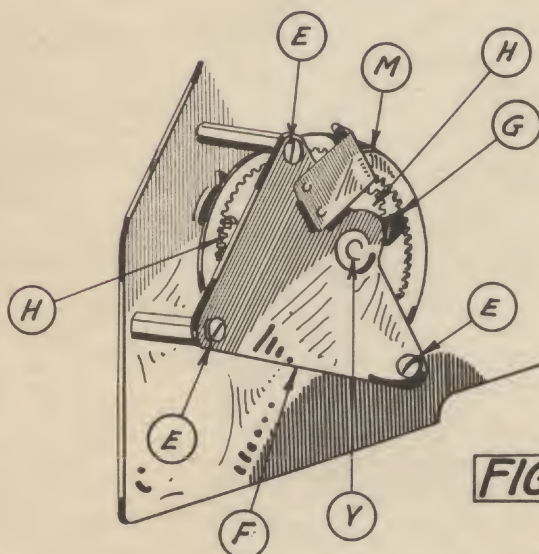
**FIG. 1**

271 RAISE UP THE TWO GUIDE BLANKS (A) AND PRY THEM FROM THE SIDE FRAME.



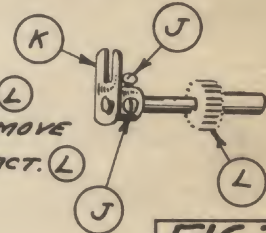
**FIG. 2**

272 REMOVE THE SCREW (C) AND TAKE OFF BELL (D).



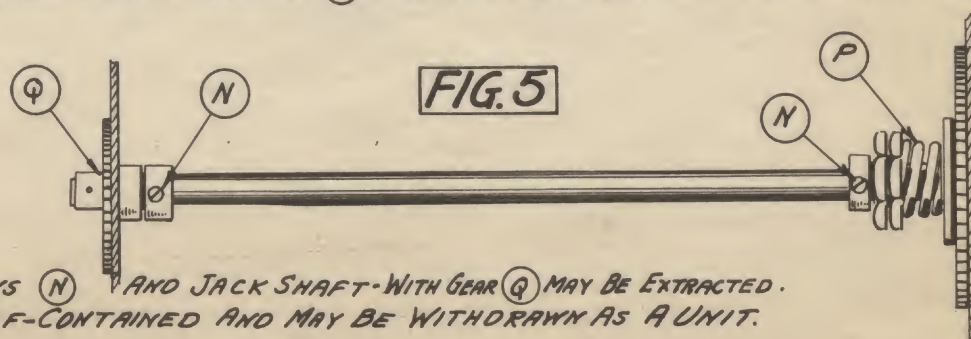
273 REMOVE SCREWS (E) AND LIFT OFF PLATE (F). REMOVE SUN GEAR (G). REMOVE WASHER BEHIND SUN GEAR. REMOVE PLANET GEARS (H).

274 TO REMOVE THE SUN PINION (L) LOOSEN SCREWS (J) AND REMOVE DRIVING ARM (K) AND EXTRACT (L).



**FIG. 3**

275 INTERNAL GEAR ASSEMBLY (M) MAY NOW BE LIFTED OFF FROM BEARING.

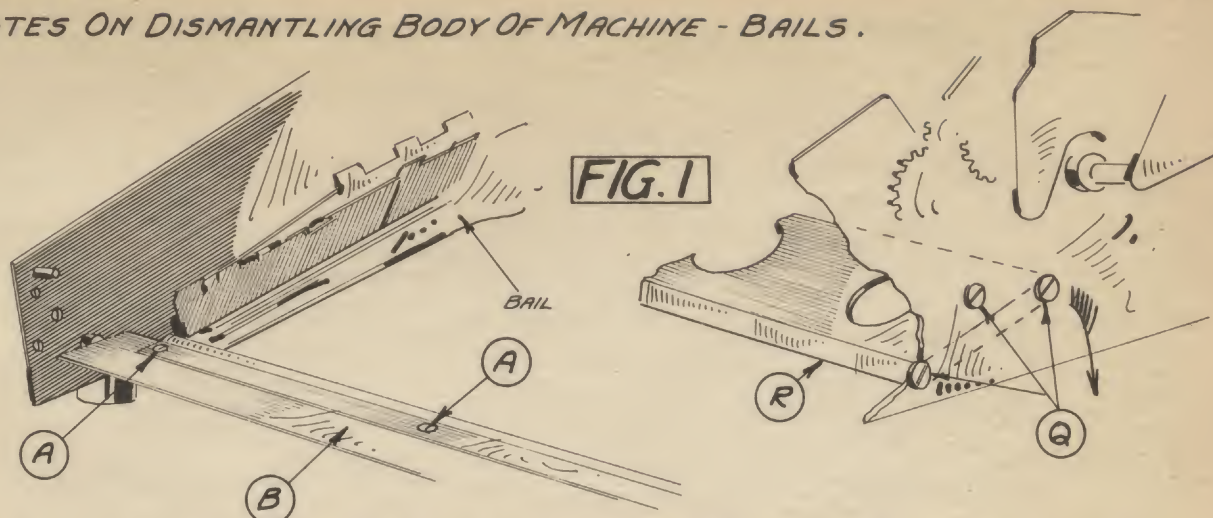


**FIG. 5**

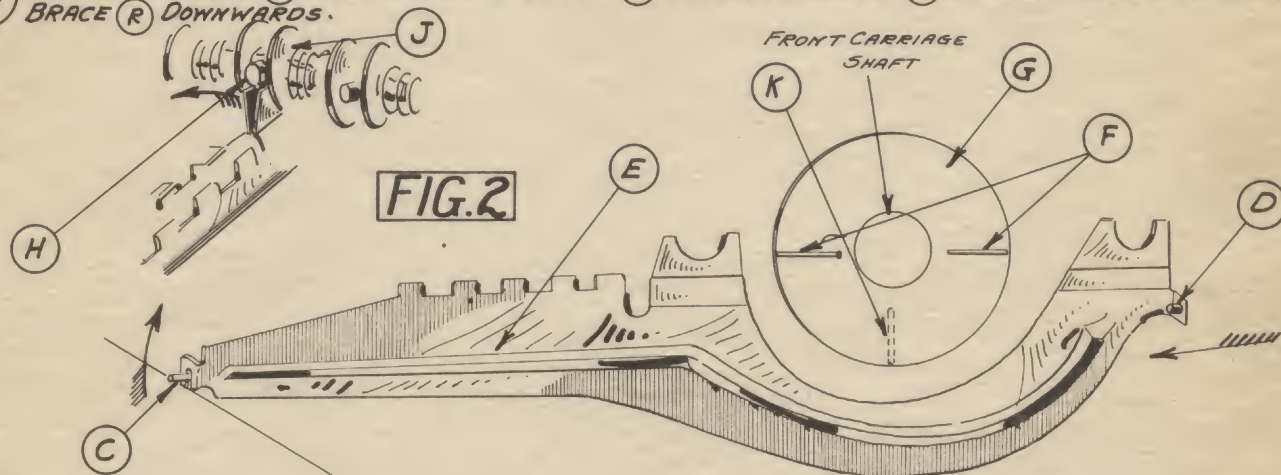
276 LOOSEN SCREWS (N) AND JACK SHAFT WITH GEAR (Q) MAY BE EXTRACTED. UNIT (P) IS SELF-CONTAINED AND MAY BE WITHDRAWN AS A UNIT.



## NOTES ON DISMANTLING BODY OF MACHINE - BAILS.

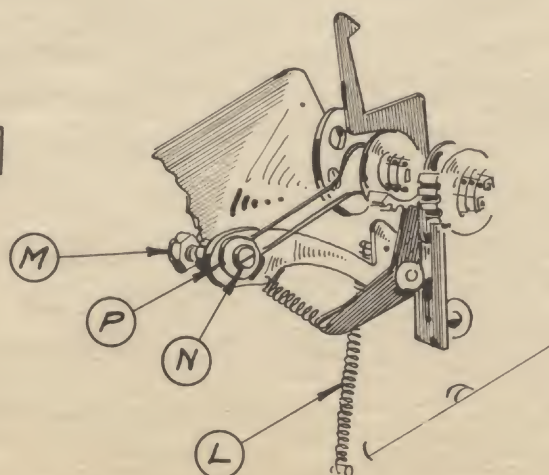


- 277 REMOVE SCREWS (A) AND RETAINING STRIP (B) - REMOVE SCREWS (Q) ON BOTH SIDES AND SWING BRACE (R) DOWNWARDS.



- 278 THE BAILS ARE HUNG UPON TWO BEARING STUDS - TO EXTRACT A BAIL LIFT BAIL (E) AT (C) AND PULL FORWARD FROM BEARING STUD (D) - INTERFERENCE MAY BE CAUSED BY DOGS (F) BEING IN LOCATION (K) - REVOLVE CARRYING SHAFT (G) UNTIL DOGS (F) ARE OUT OF WAY - SPACING PIN (H) ON SELECTING GEAR SHAFT (J) ALSO MAY INTERFERE - SWING BAIL SIDEWISE OUT OF THE WAY.

FIG. 3

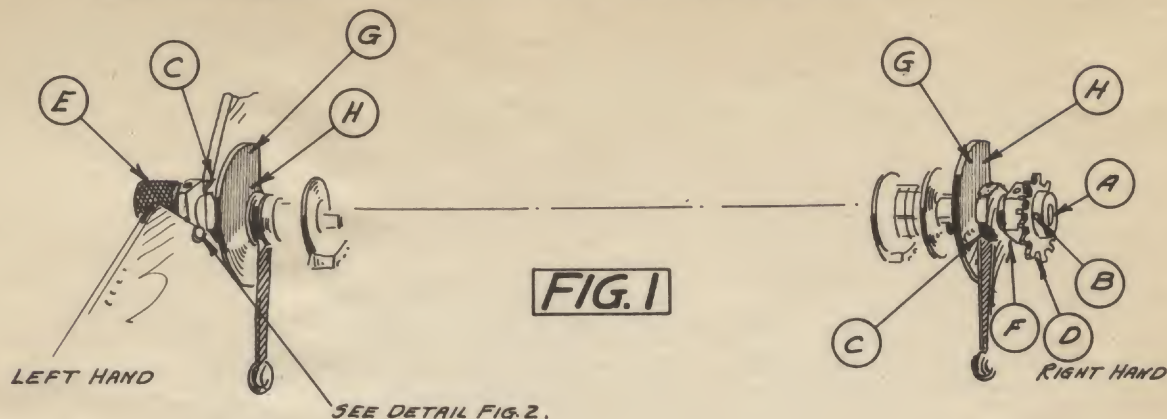


- 279 UNHOOK SPRING (L) - REMOVE NUT (M) FROM SCREW (N) - REMOVE SCREW (N) AND WASHER (P) - LEFT HAND FRONT CARRIAGE LOCK MAY NOW BE REMOVED.

- 280 RIGHT-HAND FRONT CARRIAGE LOCK MAY BE REMOVED IN SAME MANNER.



## DISMANTLING OPERATIONS - BODY OF MACHINE.



- 281 TO REMOVE THE FRONT SELECTING GEAR SHAFT ASSEMBLY (A) DRIVE OUT PIN (B) REMOVE GEAR (D) - LOOSEN THE TWO INSIDE NUTS (C) WITH KIT TOOL #61 - REMOVE ADJUSTING KNOB (E) WITH SPRING AND BEARING - REMOVE BEARING (F) - REVOLVE CARRIAGE LOCK CAMS (G) SO THAT OPENINGS (H) FACE THE INTERMEDIATE GEAR SHAFT - SELECTING GEAR SHAFT (A) MAY NOW BE TAKEN OUT.

- 282 TO REMOVE THE REAR INTERMEDIATE GEAR SHAFT LOOSEN SCREW AND REMOVE THE HOLD DOWN PLATE. (RIGHT HAND SIDE FRAME)

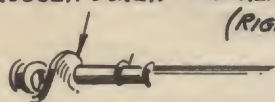
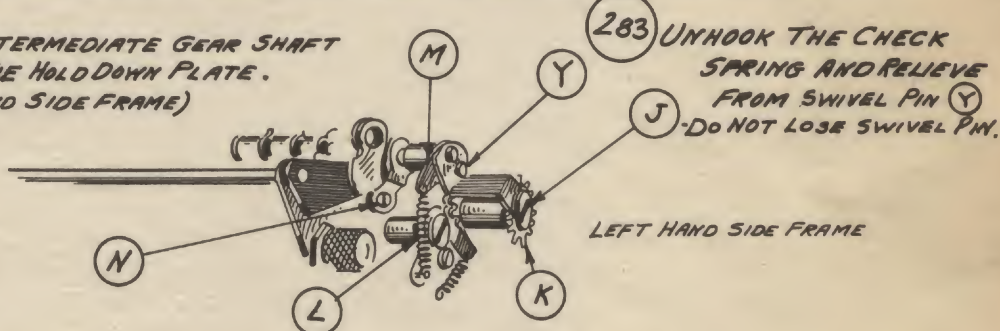
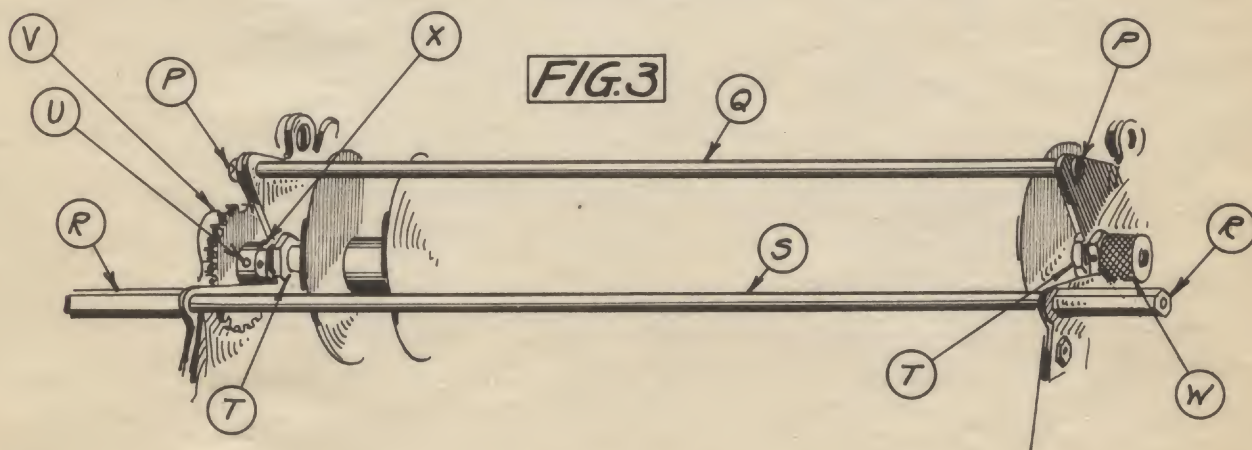


FIG. 2



- 284 REMOVE SCREW (J) AND TAKE OFF EXTRA CARRY GEAR (K) - UNHOOK SPRING (L) AND REMOVE BELL TRIGGER AND HAMMER (M) - REMOVE SCREW (N) AND THE REAR INTERMEDIATE GEAR SHAFT ASSEMBLY AND CHECK SUPPORT ROD COMPLETE MAY BE TAKEN OFF.



- 285 TAKE OFF SCREWS (P) AND REMOVE TIE ROD (Q) - REMOVE COVER CASE POSTS (R) AND TIE ROD (S) - DRIVE OUT PIN (U) AND REMOVE GEAR (V) WITH KIT TOOL #75 - LOOSEN INSIDE NUTS (T) - TAKE OFF THE ADJUSTING KNOB (W) WITH SPRING AND BEARING - REMOVE BEARING (X) AND EXTRACT REAR CARRYING SHAFT.



- 286 REMOVE THE REAR SELECTING SHAFT - SAME AS FIG. 1 PLATE 42 - THIS BULLETIN - BUT REMOVE THE FRICTION BRAKES ALSO.

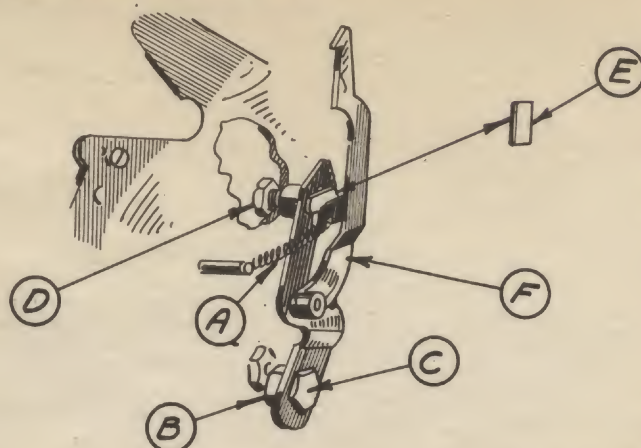


FIG. 1

- 287 UNHOOK SPRING (A) HOLD STUD (B) WITH WRENCH AND REMOVE SCREW (C) LOOSEN NUT (D) AND REVOLVE HEAD OF STUD (E) UNTIL IT IS VERTICAL - REAR RIGHT HAND CARRIAGE LOCK (F) MAY NOW BE TAKEN OFF.
- 288 TO TAKE OFF REAR LEFT HAND CARRIAGE LOCK PROCEED IN THE SAME MANNER.

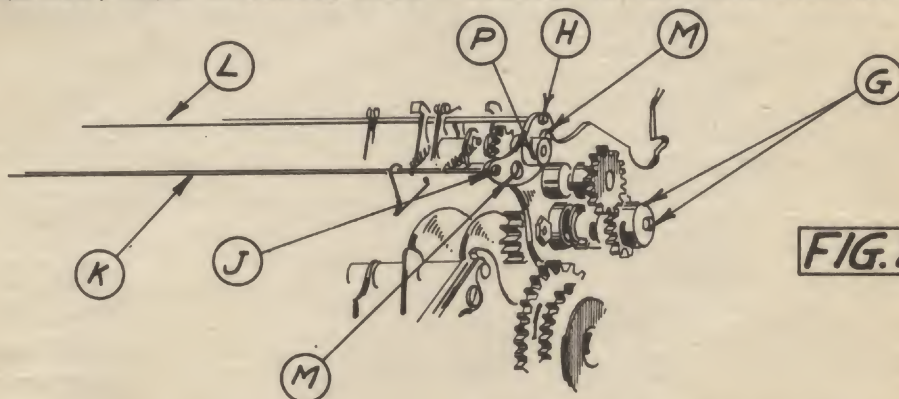


FIG. 2

- 289 REMOVE THE COUNTER SHAFT UNIT (G) - REMOVE RETAINING RING (H) AND EXTRACT SHAFT (L) - REMOVE RETAINING RING (J) AND EXTRACT SHAFT (K) - REMOVE SCREWS (M) - PRY OFF BRACKETS (P) FROM RIGHT AND LEFT HAND SIDE PLATES AND ECCENTRIC GEAR SHAFT SECTION MAY BE TAKEN OFF.

- 290 REMOVE THE FRONT INTERMEDIATE GEAR SHAFT ASSEMBLY - AS PER 282 283 284 PLATE 42 - THIS BULLETIN -

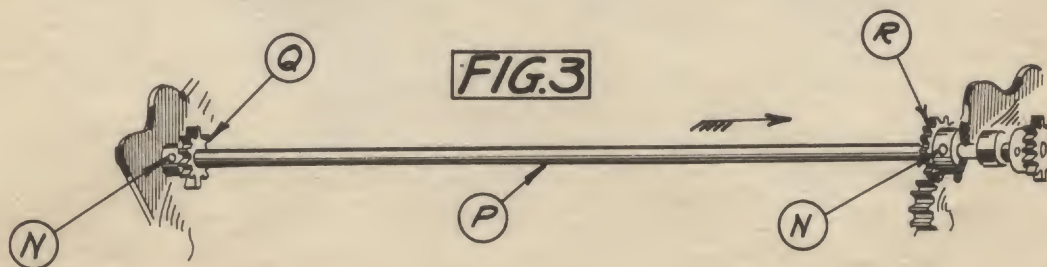


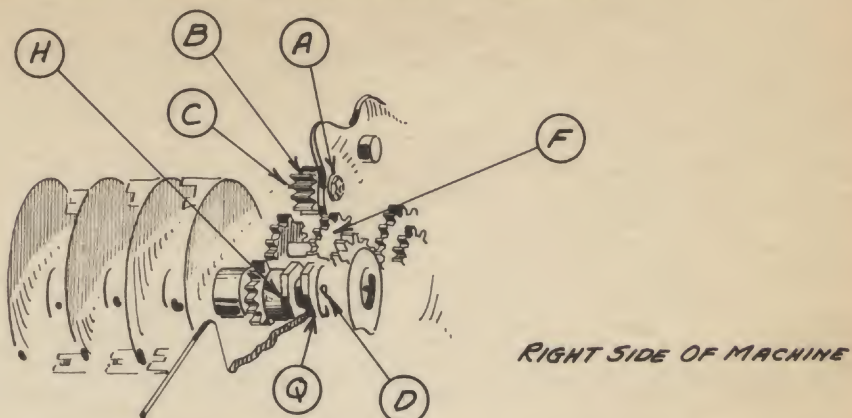
FIG. 3

- 291 REMOVE PINS (N) AND WITHDRAW JACK SHAFT (P) - NOTE GEARS (Q) AND (R) ARE NOT INTERCHANGEABLE - IT IS GOOD PRACTICE TO PLACE THE GEARS IN PLACE AS SHOWN WITH TAPER PINS INSERTED BEFORE THE SHAFT IS LAID ASIDE.



DISMANTLING THE FRONT CARRYING SHAFT.

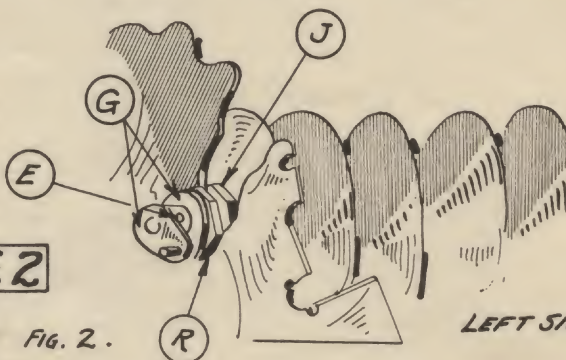
FIG. 1



RIGHT SIDE OF MACHINE

- 292 TO REMOVE THE FRONT CARRYING SHAFT TAKE OFF NUT (A) GEAR (B) AND STUD (C)-DRIVE OUT PIN (D) FIG. 1 AND PIN (E) FIG. 2-REMOVE DOUBLE GEAR (F) FIG. 1 AND PARTS (G) FIG. 2.

FIG. 2

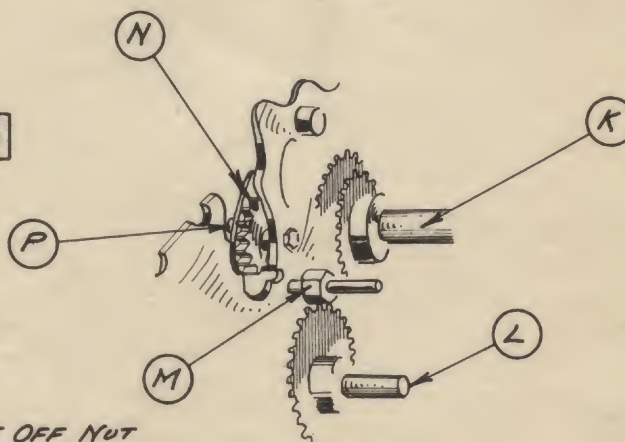


LEFT SIDE OF MACHINE

- 293 LOOSEN NUT (H) FIG. 1 AND NUT (J) FIG. 2.

- 294 REMOVE BEARING (Q) (FIG. 1-) AND BEARING (R) -THE FRONT CARRYING SHAFT MAY NOW BE EXTRACTED.

FIG. 3



- 295 TO REMOVE UNIT (K) OR (L)-TAKE OFF NUT ON STUD (M) AND REMOVE STUD.-TO REMOVE BRACKET AND GEAR (N) REMOVE NUT ON STUD (M) ONLY AND SCREW (P)

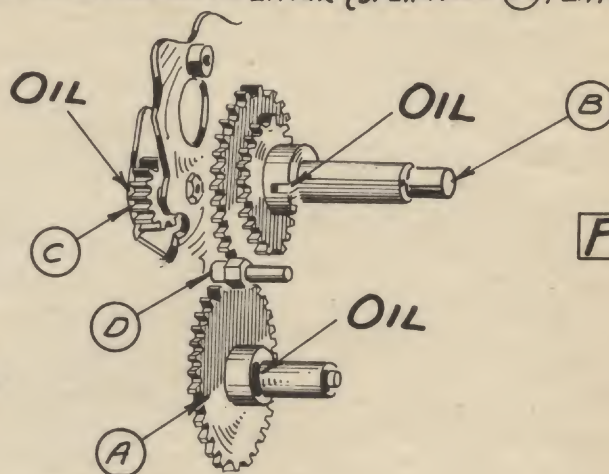
- 296 MACHINE MAY NOW BE CONSIDERED DISMANTLED. THE REMAINING OPERATIONS NECESSARY TO REMOVE CROSS MEMBERS-SIDE FRAME ETC. OFFER NO PROBLEMS-SIMPLY REMOVE THE SCREWS THAT HOLD THESE PARTS IN PLACE.



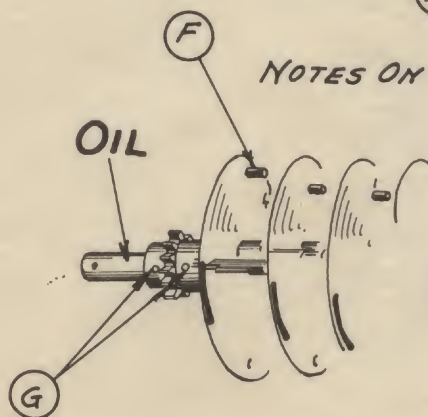
## NOTES ON THE ADJUSTMENT-REPAIR AND ASSEMBLY.

297 IT IS GOOD PRACTICE WHEN A MACHINE HAS BEEN DISMANTLED TO ITS SIDE FRAMES TO TAKE ADVANTAGE OF THE OPPORTUNITY TO INSPECT ALL ITS STUDS, PINS, SUPPORTS, NUTS, ETC. SEE THAT THEY ARE TIGHT.

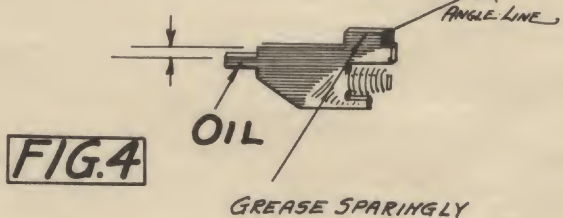
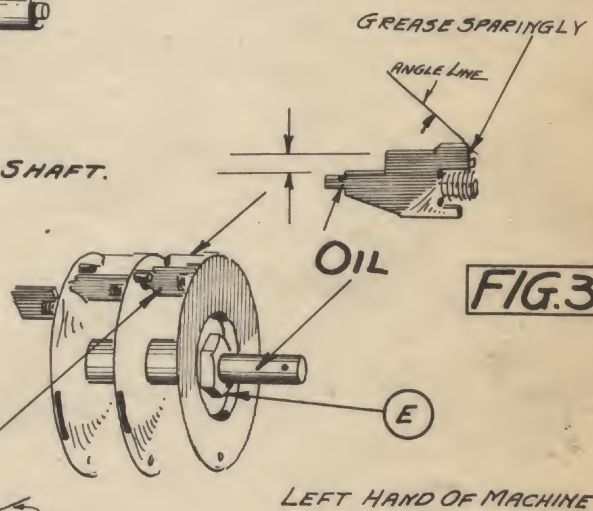
298 ASSEMBLE THE UNITS IN THIS SEQUENCE (A) - (C) - (B)  
CAUTION - STUD (D) CAN NOT BE ASSEMBLED UNTIL LATER (OPERATION 309 PLATE 47) - THIS BULLETIN -



299 TIGHTEN NUTS ON (A) (C) SECURELY BUT DO NOT STRIP.



NOTES ON CARRYING SHAFT.



LEFT HAND OF MACHINE

300 TO FURTHER DISMANTLE A CARRYING SHAFT LOOSEN NUT (E) - CAUTION - BE SURE TO MAINTAIN THE SAME SEQUENCE WHEN ASSEMBLING.

301 INSPECT PINS (F) FOR TIGHTNESS; INSPECT TAPER PINS (G) AND TIGHTEN IF NEEDED; INSPECT DOGS FOR FREEDOM OF ACTION AND SPRING TENSION.

302 IMPORTANT - DOGS USED IN ONE SPIRAL ARE NOT INTERCHANGEABLE WITH THOSE USED IN OTHER SPIRAL. IDENTIFY DOG IN QUESTION ACCORDING TO FIG. 3 AND 4.



ASSEMBLY AND ADJUSTMENT NOTES  
FRONT CARRYING SHAFT.

- 303 PLACE THE NUTS (A) AND (B) UPON THE SHAFT AND TIME THE GEARS AS SHOWN IN FIG. 2.

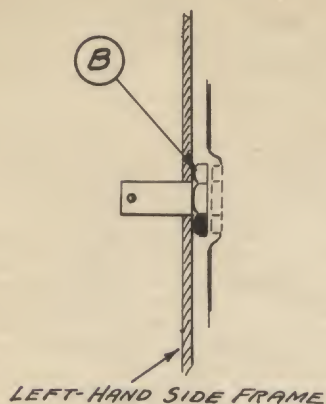
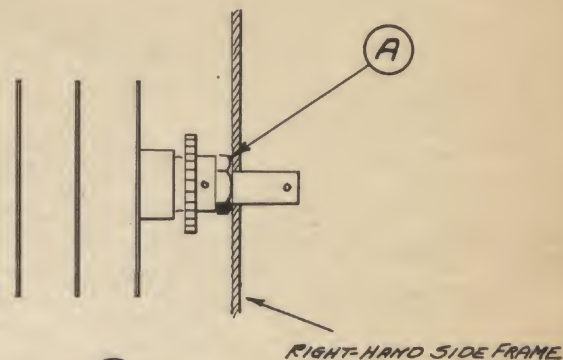
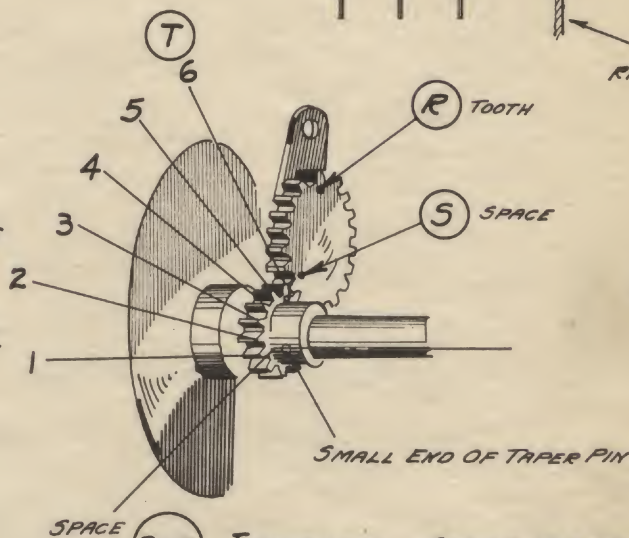


FIG. 1



- 304 NOTE - THIS POINT CONCERNS THREE TIMING MARKS (R) (S) (T) MESH TOOTH (T) INTO SPACE (S) WHEN TOOTH (R) IS IN POSITION SHOWN.



- 305 IMPORTANT - AFTER THE TIMING HAS BEEN FINISHED IN THE ABOVE RELATION A ROTATION OF THE CARRYING SHAFT WILL DISTURB IT AND IT MUST AGAIN BE RETURNED TO ITS ORIGINAL POSITION BY ADDITIONAL ROTATIONS BEFORE FURTHER TIMING OF THE MESH IS POSSIBLE.

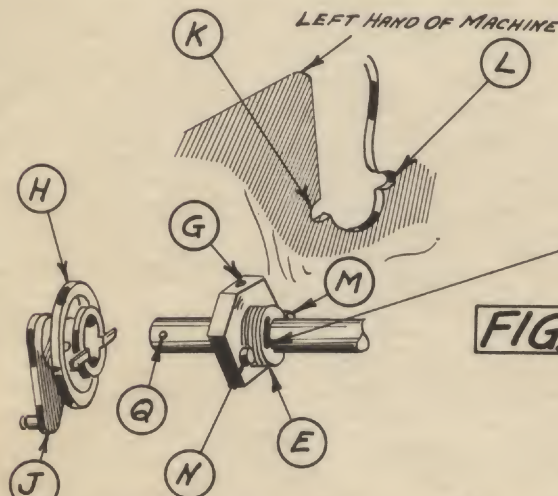
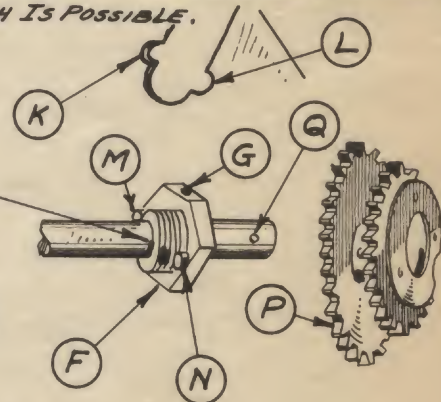


FIG. 4



- 306 FRAME CONTAINS SLOTS (K) AND (L) PINS (M) AND (N) ENGAGE THESE SLOTS - ASSEMBLE THE BEARINGS (E) AND (F). - CAUTION - NOTE THAT PUNCH MARK (G) IS ON UPPER FLAT - ASSEMBLE UNITS (H) AND (J) AND DRIVE PIN (Q) HOME.

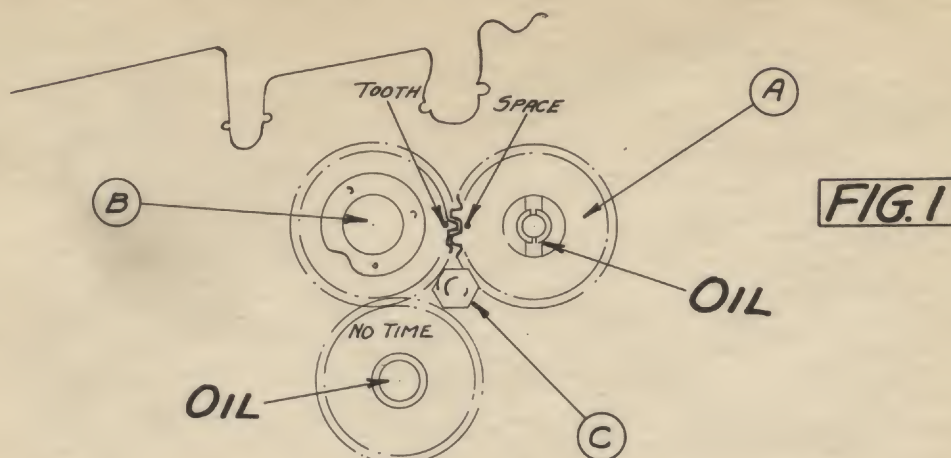
THREAD THE NUTS (A) (B) UPON THE BEARINGS.  
- LINE UP TAPER HOLE IN UNIT (P).

- 308 ASSEMBLE THE UNIT (P) WITH TAPER PIN AT (Q).

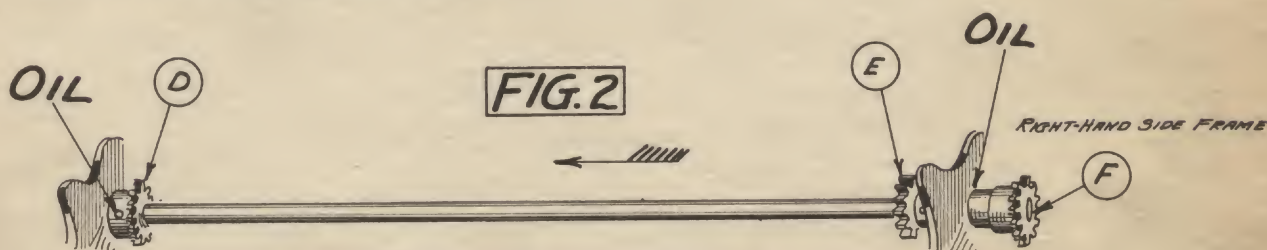
- 307 IMPORTANT - BEARINGS (N) ARE LINE REAMED AND ARE NOT INTERCHANGEABLE.



## ASSEMBLY AND TIMING NOTES CARRYING SHAFT MECHANISM.



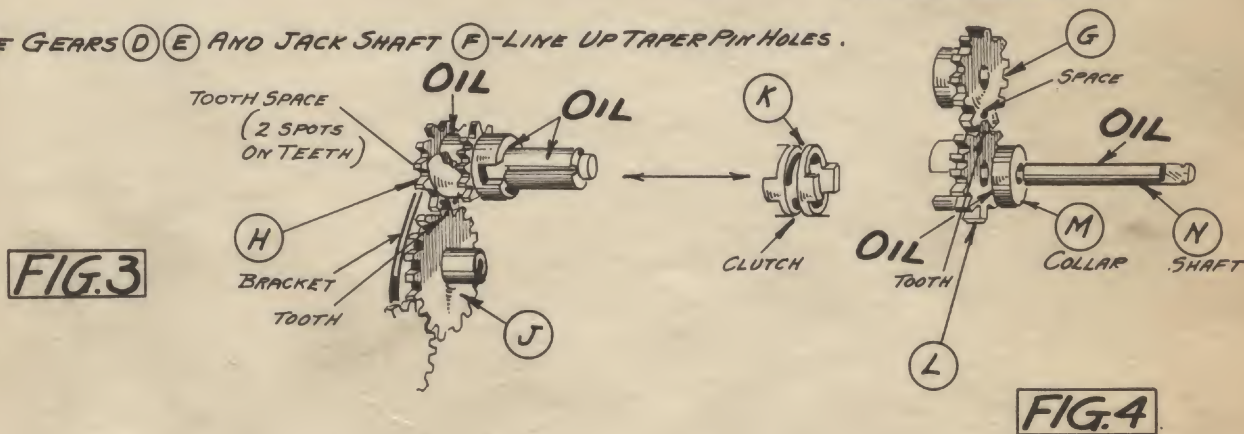
- 309 INSERT UNIT (A) AND TIME UNIT (B) AS SHOWN ABOVE-INSERT STUD (C) AND TIGHTEN WITH NUT ON REVERSE SIDE OF SIDE PLATE.



- 310 NOTE - POSITION OF GEARS, HUBS MUST BE OUTWARD.

- 311 NOTE - GEARS ARE NOT INTERCHANGEABLE.

- 312 ASSEMBLE GEARS (D) (E) AND JACK SHAFT (F)-LINE UP TAPER PIN HOLES.



- 313 PLACE COUNTERSHAFT GEAR (H) IN TIME WITH LARGE IDLER GEAR (J) AS SHOWN IN FIG. 3  
- ASSEMBLE CLUTCH COLLAR (K).

- 314 ASSEMBLE CLUTCH GEAR (L) IN TIME WITH JACK SHAFT GEAR (G).

- ASSEMBLE COLLAR (M) AND INSERT SHAFT (N).



ASSEMBLING OPERATIONS  
COUNTERSHAFT MECHANISM.

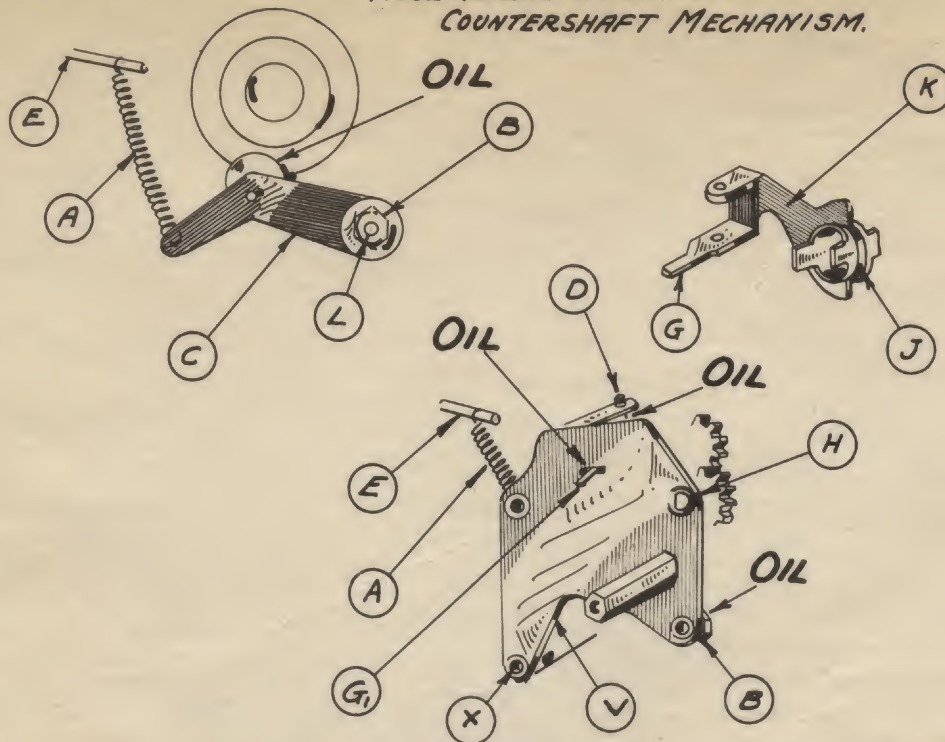


FIG. 1

- 315 PLACE LOCATOR (C) WITH ADJUSTING NUT (B) UPON POST (L) - HOOK UP SPRING (A) TO STUD (E)  
 - INSERT SHIFT FORK (K) IN COLLAR (J).  
 INSERT POINT (G) INTO SLOT (G<sub>1</sub>) - LOCATE COUNTERSHAFT (H) AND ASSEMBLE PLATE (V)  
 - TIGHTEN IN PLACE TEMPORARILY WITH ONE SCREW AT (X).

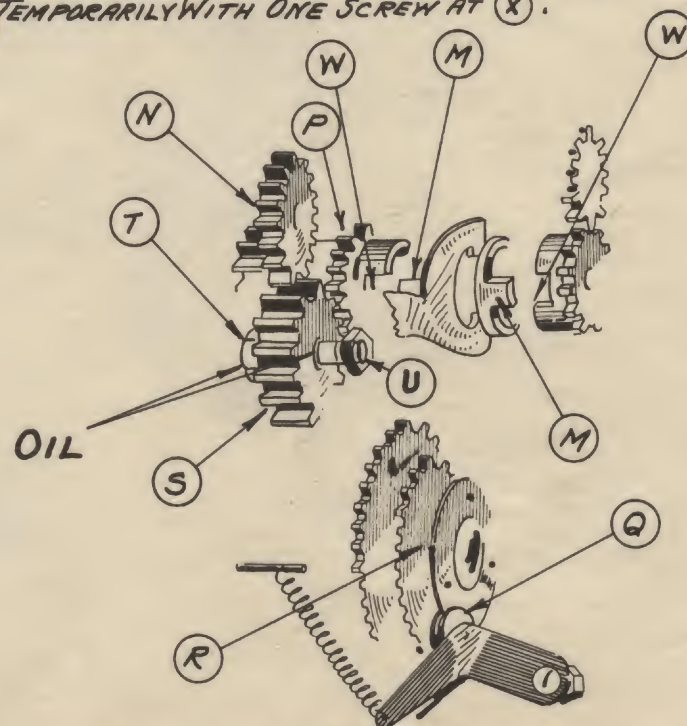


FIG. 2

- 316 WITH THE CARRYING SHAFT MECHANISM (R) IN NEUTRAL - LINE UP TEETH OF CLUTCH (M) WITH SPACES (W) SO THAT THEY WILL ENGAGE FREELY - AFTER WHICH MESH IDLER GEAR (S) INTO TEETH OF GEARS (P) AND (N) AND ATTACH (S) IN THIS POSITION TO THE SIDE FRAME WITH STUD (T) AND NUT (U).



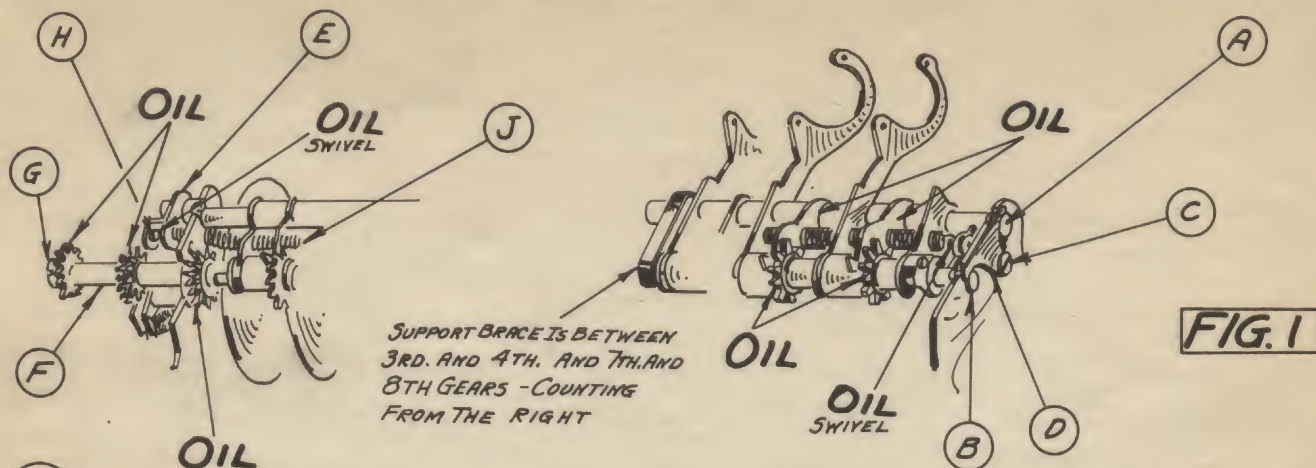


FIG. 1

- 317 WHEN ASSEMBLING THE FRONT INTERMEDIATE GEAR SHAFT PLACE THE ASSEMBLY IN GROOVES ON SIDE FRAMES, - PLACE ANCHOR BLANK (D) AND FASTEN LIGHTLY WITH SCREW (C) - THEN TAP DOWN SHAFTS (A) AND (B) UNTIL THEY ARE PROPERLY SEATED IN SIDE FRAMES, TAP DOWN BLANK (D) TO HOLD SHAFTS SECURELY AND TIGHTEN SCREW (C).
- 318 BLANK (E) (LEFT HAND SIDE) IS ON THE SHAFT WHEN ASSEMBLY IS INSERTED.
- 319 ASSEMBLE EXTRA CARRY UNIT (F) WITH SCREW (G).
- 320 INSERT SWIVEL PIN (H) INTO BLANK (E) AND HOOK UP CHECK SPRING (J) TO PIN (H).
- 321 SEE PLATES 37 - 38 - 39 - 40 BULLETIN 34 FOR ADDITIONAL INFORMATION.

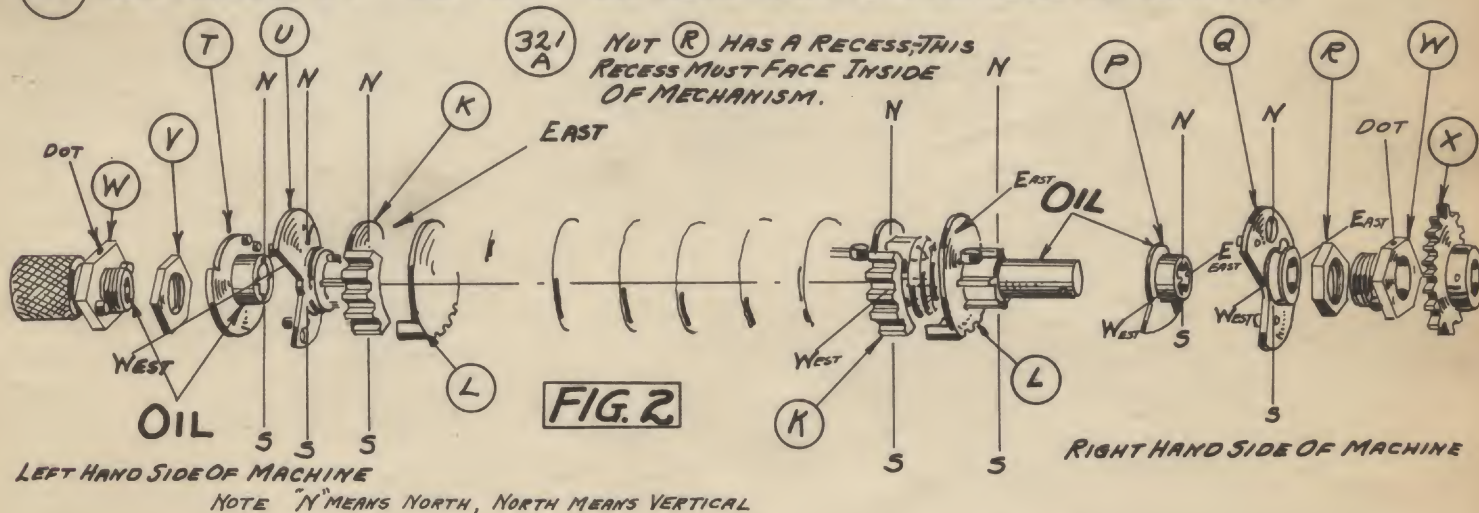


FIG. 2

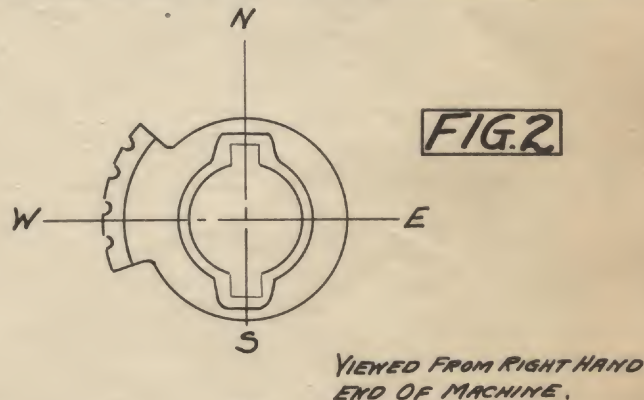
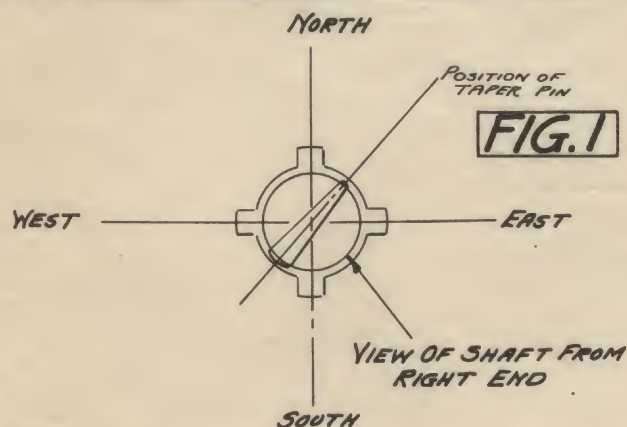
- (RIGHT SIDE)
- 322 IT IS ASSUMED IN THIS CASE THAT SELECTING GEARS (K) AND (L) HAVE NOT BEEN DISTURBED, IN THAT CASE THE SELECTING GEARS ARE IN THE RELATION SHOWN IN FIG. 2. ASSEMBLE PART (P) - PAYING STRICT ATTENTION TO "NORTH-EAST-SOUTH AND WEST" AND FOLLOW WITH (Q) - PUT ON NUT (R).
- 323 (LEFT SIDE)
- PLACE PARTS (T) AND (U) WITH STRICT ATTENTION TO "NORTH-EAST-SOUTH-WEST" AND PUT NUT (V) ON SHAFT.
- 324 PLACE THE UNIT INTO FRAME, PLACE BEARINGS (W) ONTO SHAFT, WITH DOT ON TOP, TIGHTEN NUTS (V) AND (R) AND ASSEMBLE GEAR (X) WITH TAPER PIN PROPERLY PLACED.



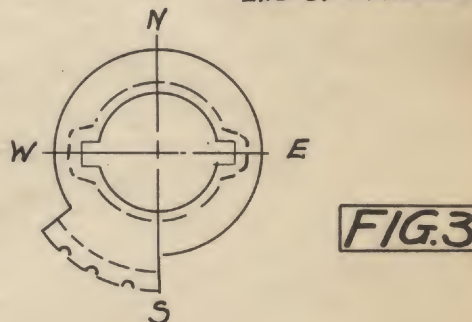
## NOTES ON DISMANTLING ASSEMBLY, REPAIR AND ADJUSTMENT OF THE SELECTING GEARS.

- 325 SEE PLATE 42 FIG.1 - THIS BULLETIN - FOR REMOVING THE FRONT SELECTING GEAR SHAFT AND OPERATING PARTS.
- 326 SEE PLATE 42 FIG.1 - THIS BULLETIN, FOR REMOVING THE REAR SELECTING GEAR SHAFT AND OPERATING PARTS.
- 327 SEE PLATE 21 AND 22 BULLETIN <sup>#</sup>34 FOR DETAILS OF DISMANTLING THE SELECTING GEARS.
- 328 EACH SELECTING GEAR IS STAMPED WITH A NUMBER WHICH IDENTIFIES ITS POSITION ON THE SHAFT ACCORDING TO THE TABLE BELOW - ON THIS MODEL -
- 329 THIS SEQUENCE MUST BE FOLLOWED WHEN REASSEMBLING OR MAKING REPLACEMENTS OR THE MESHING AND TIMING OF THESE GEARS WITH THE INTERMEDIATE GEAR WILL BE AFFECTED.

COLUMN	10 TH.	9 TH.	8 TH.	7 TH.	6 TH.	5 TH.	4 TH.	3 RD.	2 NO.	1 ST.	
NUMBER ON GEAR	3	1	4	8	7	6	5	3	7	1	FOUR-SIDE SELECTING GEAR
	1	6	2	7	3	5	4	1	3	6	FIVE-SIDE SELECTING GEAR



- 330 ABOVE IS SHOWN THE RELATION BETWEEN THE TAPER PIN IN SHAFT AND THE TIMING CYCLE - NORTH - EAST - SOUTH AND WEST - 'NORTH' IS TO BE KNOWN AS VERTICAL TO THE MACHINE WHEN MECHANISM IS IN NEUTRAL.

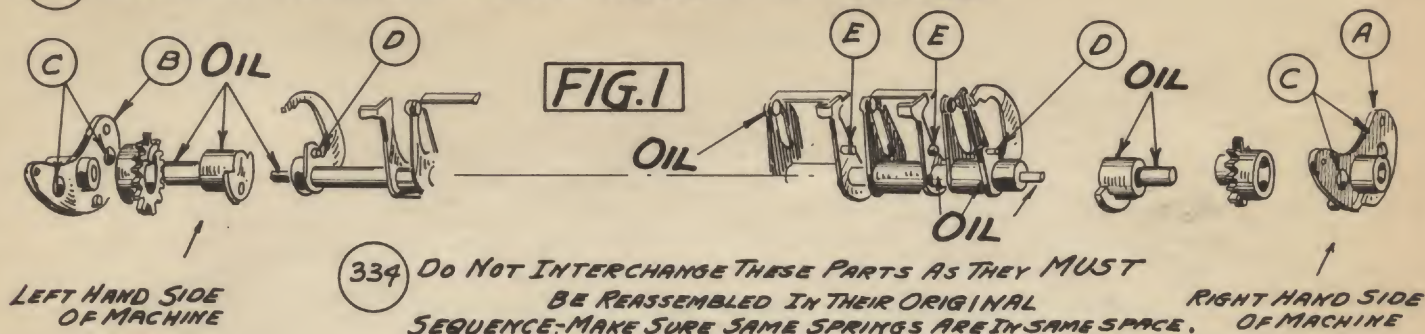


- 331 SEE PLATE 45 - 46 - BULLETIN <sup>#</sup>34 FOR ASSEMBLING AND ADJUSTMENT NOTES.
- 332 PLATE 49 OF THIS BULLETIN CONTAINS THE ASSEMBLING NOTES.

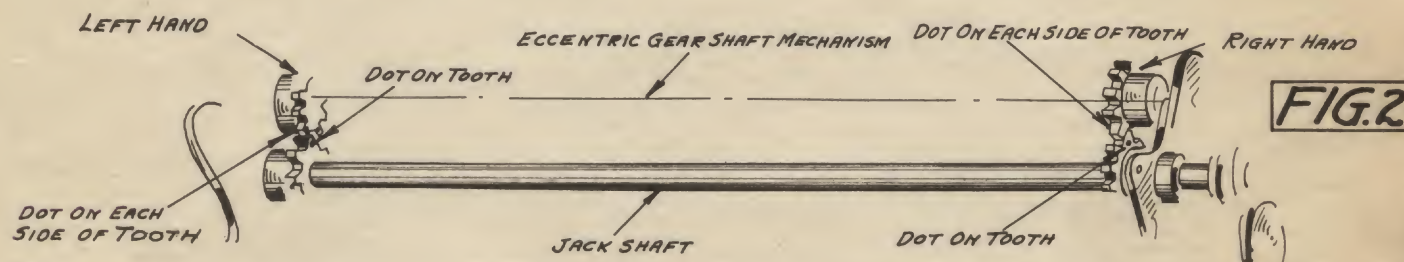


## NOTES ON ASSEMBLING THE ECCENTRIC GEAR SHAFT SECTION.

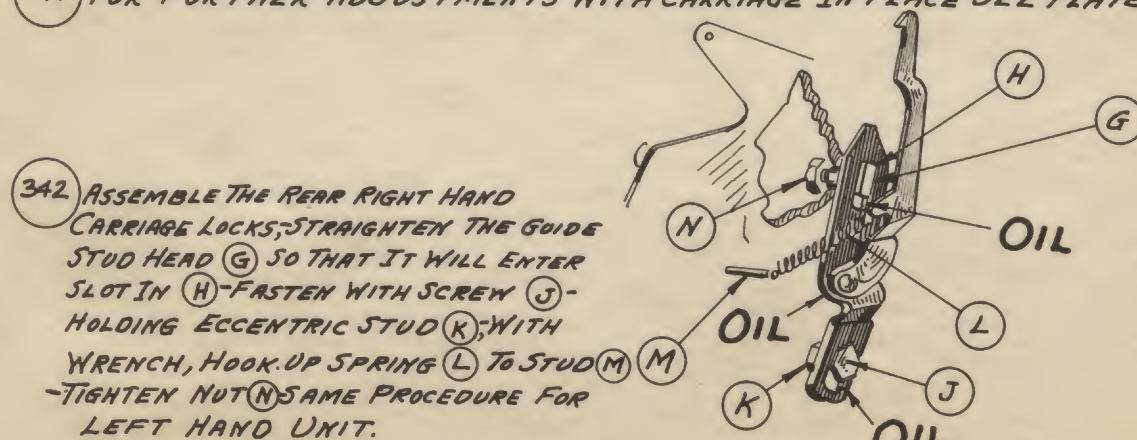
- 333 BELOW IS SHOWN THE PROPER SEQUENCE OF ASSEMBLY.



- 335 LAY THE SHAFT ASSEMBLY INTO THE MACHINE WITHOUT THE END BEARINGS (A) AND (B). - MESH IN TIME AS SHOWN BELOW.



- 336 ASSEMBLE THE BEARINGS (A) AND (B) AND FASTEN EACH WITH TWO SCREWS (C).
- 337 INSERT THE SPRING ROD-THREADING THE SPRINGS IN THEIR PROPER PLACES AND FASTEN WITH ITS RETAINING RING. IMPORTANT-SPRINGS (D) DIFFER FROM SPRINGS (E) FIG. 1.
- 338 INSERT THE CAMMING ROD (NOTE-SEE THAT IT IS STRAIGHT BEFORE INSERTING) FASTEN WITH RETAINING RING.
- 339 NOTE-INSPECT THE SPRINGS. LOOPS SHOULD BE IN LINE AS SHOWN OTHERWISE THEY MAY FLY OFF THE PINS IN OPERATION.
- 340 FOR DISMANTLING NOTES SEE PLATE 43-FIG. 2. - THIS BULLETIN -
- 341 FOR FURTHER ADJUSTMENTS WITH CARRIAGE IN PLACE-SEE PLATE 65. - THIS BULLETIN -



- 342 ASSEMBLE THE REAR RIGHT HAND CARRIAGE LOCKS; STRAIGHTEN THE GUIDE STUD HEAD (G) SO THAT IT WILL ENTER SLOT IN (H)-FASTEN WITH SCREW (J)-HOLDING ECCENTRIC STUD (K) WITH WRENCH, HOOK UP SPRING (L) TO STUD (M)-TIGHTEN NUT (N) SAME PROCEDURE FOR LEFT HAND UNIT.

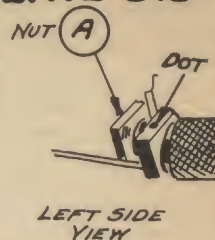


# MODEL MA 213

# PLATE 52

## NOTES ON ASSEMBLING THE REAR CARRYING SHAFT.

FIG.1



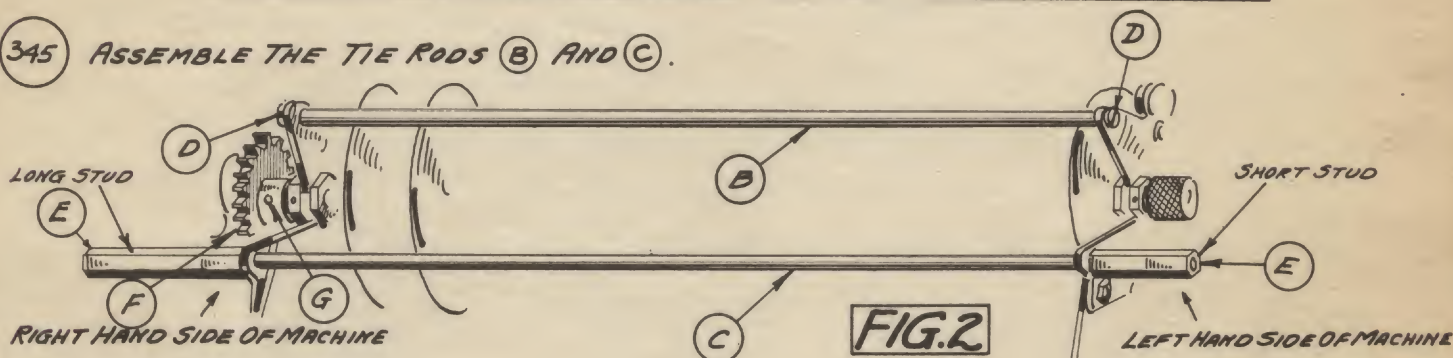
- 343 PLACE THE NUTS UPON THE SHAFT. INSERT THE ASSEMBLY WITH NUTS INTO THE SIDE FRAMES OF THE MACHINE.

INSERT BEARING WITH DOT FACING THE OPENING AS SHOWN  
TIGHTEN NUTS (A) SECURELY.

ASSEMBLE THE GEAR (F) WITH TAPER HOLES (G) PROPERLY ALIGNED AND DRIVE HOME PIN (G) SECURELY.

- 344 SEE ALSO PLATE 45 - THIS BULLETIN -

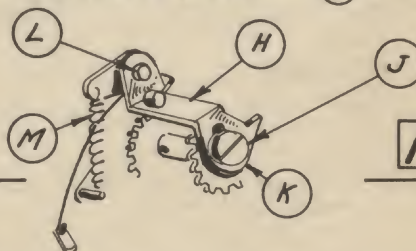
- 345 ASSEMBLE THE TIE RODS (B) AND (C).



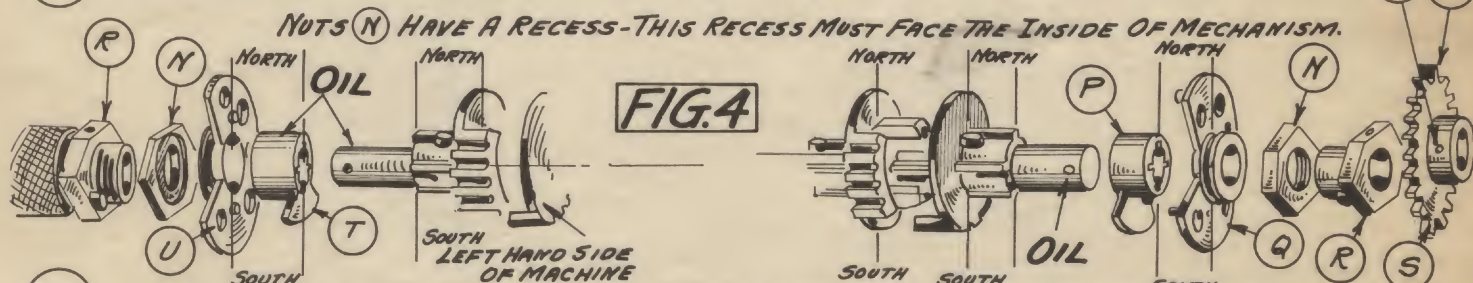
- 346 NOTE LENGTH OF STUDS AND ASSEMBLE THE TIE RODS (B) (C) - USING STUDS (E) AND SCREWS (D).

- 347 THE REAR INTERMEDIATE GEAR SHAFT ASSEMBLY IS ASSEMBLED AS IS THE FRONT - SEE ALSO PLATE 49 - THIS BULLETIN. - NOTE - DO NOT PERFORM OPERATION 319 AT THIS TIME

- 348 ASSEMBLE THE BELL TRIGGER AND HAMMER (H) TO SHAFT (L) AND HOOK UP SPRING (M) AND PERFORM OPERATION 319 PLATE 49.



- 349 ASSEMBLE THE REAR SELECTING GEAR SHAFT.



- 350 IT IS ASSUMED, IN THIS CASE, THAT THE SELECTING GEARS HAVE NOT BEEN DISTURBED; IN THAT CASE THE SELECTING GEARS ARE IN THE RELATION SHOWN IN FIG. 4 - ASSEMBLE PARTS (P) AND (Q), PAYING STRICT ATTENTION TO VERTICAL LINES "NORTH AND SOUTH" AND MATCH THEM WITH THE "NORTH AND SOUTH" OF THE SELECTING GEARS; PUT NUT (N) UPON THE SHAFT - FOLLOW THIS BY ASSEMBLING PART (T) AND (U) AND; PAYING THE SAME STRICT ATTENTION TO THE "NORTH AND SOUTH" POSITIONS AND MATCH THEM WITH THE SELECTING GEAR "NORTH AND SOUTH" LINE - PLACE NUT (N) UPON THE SHAFT.

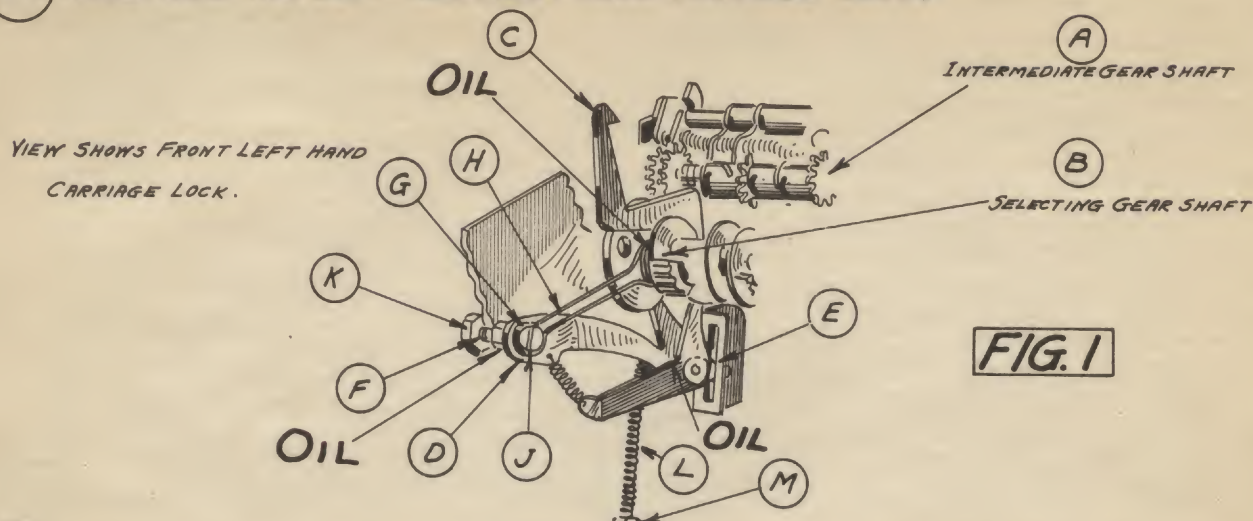
- 351 PLACE THE UNIT INTO FRAME WITH NUTS (N) INSIDE; PLACE BEARINGS (R) ONTO SHAFT WITH DOT ON TOP - TIGHTEN NUTS (N) - ASSEMBLE THE FRICTION BRAKES INTO GROOVES ON (Q) AND (U).

- 352 ASSEMBLE THE GEAR (W) WITH TAPER PIN (X) SEE ALSO NOTES ON PLATE 50 IN THIS BULLETIN.



## NOTES ON ASSEMBLING.

- 353 ASSEMBLE THE LEFT AND RIGHT HAND CARRIAGE LOCKS.



- 354 INSERT THE FRONT LEFT HAND CARRIAGE LOCK (C) BETWEEN (A) AND (B) NOTE THAT END OF LEVER (D) IS IN SLOT OF GUIDE AT (E) - PLACE (D) AGAINST PLATE AT HOLE (F) - PLACE BEARING COLLAR (G) AGAINST (D) - INSERT FRICTION BRAKE (H) ON BEARING COLLAR (G) - INSERT SCREW (J) AND TIGHTEN WITH NUT (K) SECURELY - HOOK UP SPRING (L) TO POST (M).

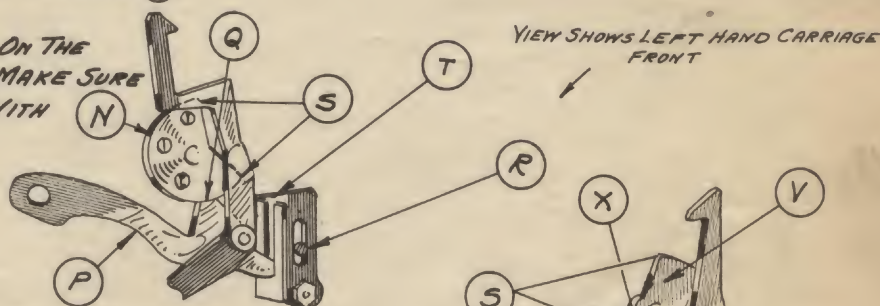
- 355 INSERT THE FRONT RIGHT HAND CARRIAGE LOCK (C) BETWEEN (A) AND (B) - NOTE THAT END OF LEVER (D) IS IN SLOT OF GUIDE AT (E) - PLACE SPACING COLLAR AGAINST PLATE AT HOLE - INSERT FRICTION BRAKE AGAINST SPACING COLLAR - PLACE CARRIAGE LOCK IN FRICTION BRAKE AND AGAINST SPACING COLLAR - INSERT SCREW AND TIGHTEN NUT SECURELY - HOOK UP SPRING.

### ADJUSTMENT NOTES FOR FRONT AND REAR CARRIAGE LOCKS.

- 356 THERE SHOULD BE NO MORE THAN .003" PLAY BETWEEN (N) AND (P) AT (Q) - FIG. 2 - TO EFFECT THIS ADJUSTMENT TURN ECCENTRIC (R) - REVOLVE SELECTING SHAFT TO SEE THAT IT TURNS FREELY AND THAT THE POINTS (S) DO NOT STRIKE (P).

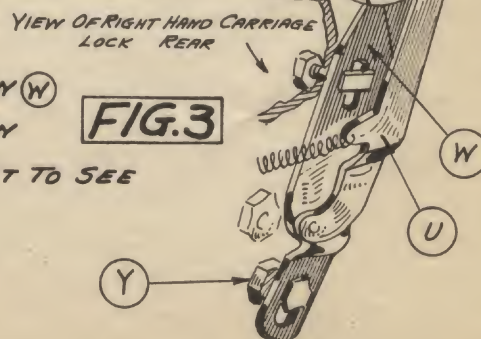
- 357 NOTE - IN MAKING THE ABOVE ADJUSTMENT ON THE LEFT HAND FRONT CARRIAGE LOCK; MAKE SURE THAT POINT (T) DOES NOT INTERFERE WITH THE CARRYING DOGS.

FIG. 2



- 358 TO ADJUST THE REAR CARRIAGE LOCKS THERE SHOULD BE NO MORE THAN .003" PLAY BETWEEN (W) AND (V) AT (X) - TO EFFECT THIS ADJUSTMENT TURN ECCENTRIC STUD (Y) - REVOLVE THE SELECTING SHAFT TO SEE THAT IT TURNS FREELY AND THAT POINTS (S) DO NOT STRIKE (W).

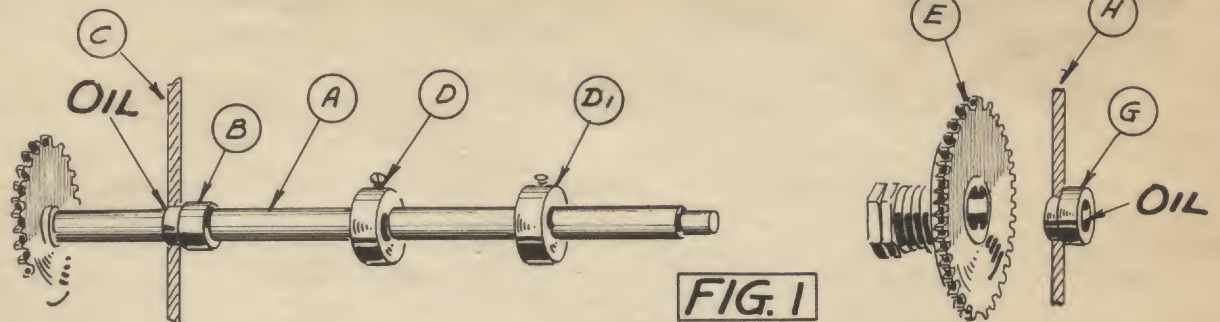
FIG. 3





ASSEMBLING NOTES.

359 ASSEMBLE THE MAIN JACK SHAFT.

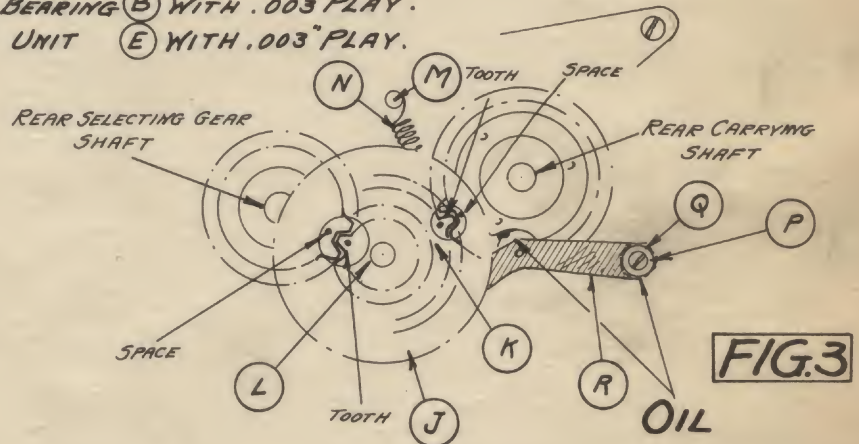
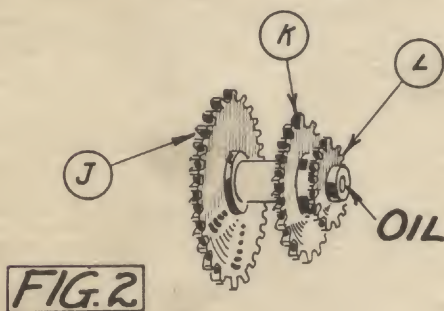


360 THREAD THE SHAFT (A) THROUGH BUSHING (B) IN RIGHT-HAND SIDE FRAME (C) - THREAD THE LOCK COLLARS (D) (D1) UPON THE SHAFT (A) - PLACE THE FRICTION UNIT (E) AGAINST THE INNER FACE OF THE LEFT HAND SIDE FRAME (H) - THREAD SHAFT THROUGH THE UNIT INTO THE BEARING (G).

NO TIMING NECESSARY.

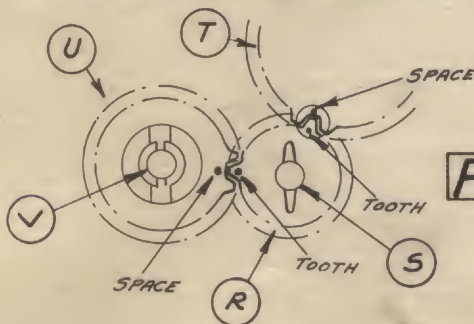
TIGHTEN LOCK COLLAR (D) AGAINST BEARING (B) WITH .003" PLAY.

TIGHTEN LOCK COLLAR (D1) AGAINST UNIT (E) WITH .003" PLAY.

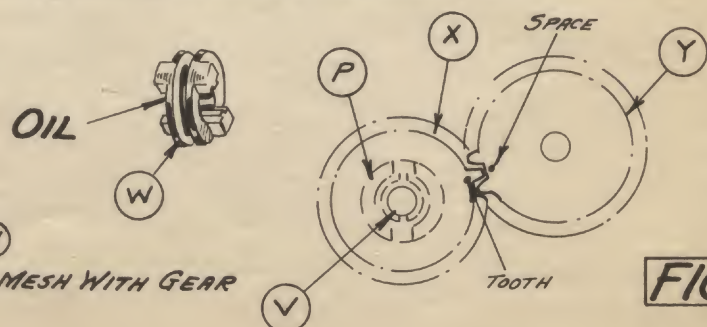


361 ASSEMBLE GEAR UNIT (J) (K) (L) BETWEEN REAR SELECTING GEAR SHAFT AND REAR CARRYING SHAFT - IN TIME AS SHOWN IN FIG. 3.

362 ASSEMBLE LOCATOR ARM AND ROLLER (R) UPON STUD (P) AND FASTEN WITH SCREW (Q) HOOK SPRING (N) UPON POST (M).



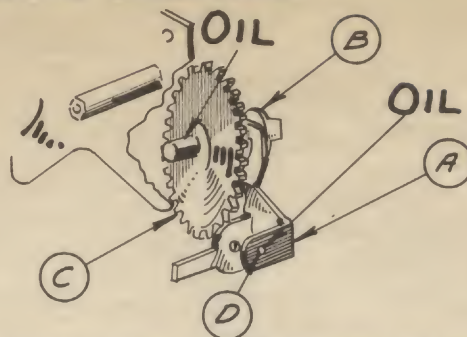
363 ASSEMBLE IDLER GEAR (R) ON STUD (S) IN TIME WITH GEARS (T) AND (U) - REPLACE RETAINING CLIP.



364 ASSEMBLE CLUTCH (W) ONTO SHAFT (V) - ASSEMBLE GEAR (X) ON SHAFT (V) AND MESH WITH GEAR (Y) AS SHOWN.

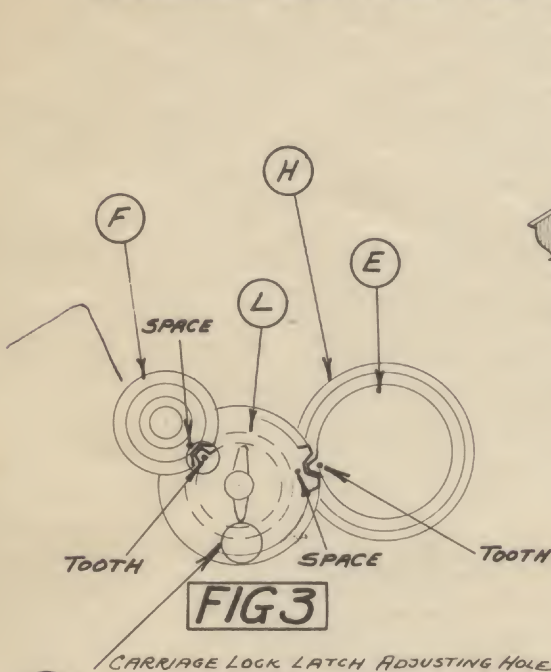


## ASSEMBLING OPERATIONS



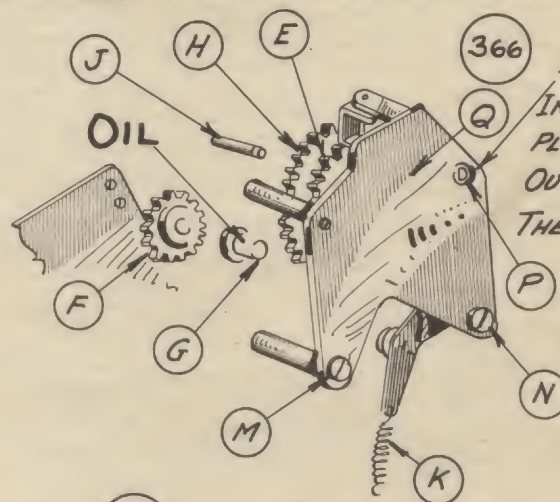
**FIG. 1**

- 365 INSERT FORK (A) INTO CLUTCH COLLAR (B) BEHIND GEAR (C) HOLD FORK (A) AND ASSEMBLE RETAINING PLATE UPON THE STUDS; ASSEMBLE THE PIVOT STUD (D) INTO FORK YOKE.



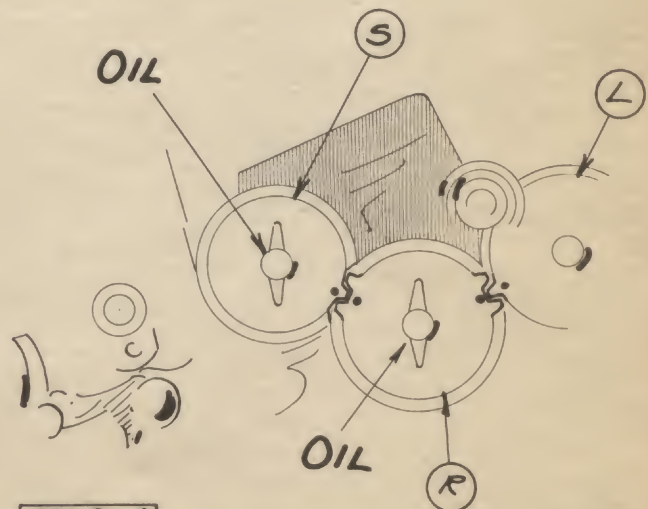
**FIG. 3**

- 368 TIGHTEN SCREW (M) AND (N) AND HOOK UP SPRING (K) TO PIN (J).



**FIG. 2**

- 366 **IMPORTANT**  
IN PERFORMING OPERATION, PLATE (Q) MUST BE MOVED OUTWARD ONLY ENOUGH TO PERMIT THE ASSEMBLY OF GEAR (L) - OTHERWISE COUNTERSHAFT (P) WILL DROP OFF AND DESTROY PREVIOUS TIMING.
- 367 UNHOOK SPRING (K) FROM POST (J) AND ALLOW UNIT TO DROP - LOOSEN SCREW (M) SUFFICIENTLY SO THAT DOUBLE GEAR (L) CAN BE PLACED ON STUD (G) AND MESH IN TIME WITH GEARS (F) AND (E) AS SHOWN IN FIG. 3 - REPLACE RETAINING CLIPS.

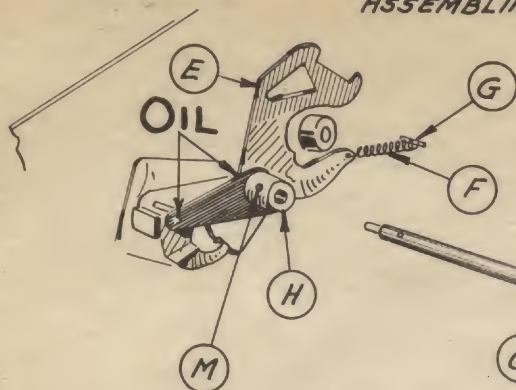


**FIG. 4**

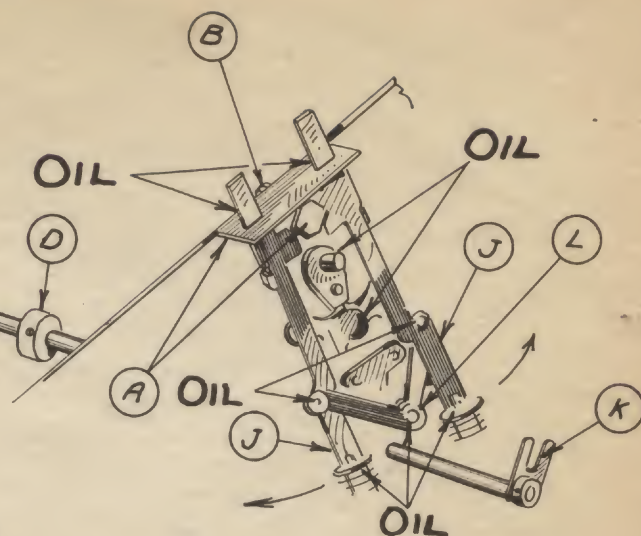
- 369 ASSEMBLE GEAR (R) BETWEEN GEARS (L) AND (S) - IN TIME AS SHOWN IN FIG. 4. PUT ON RETAINING CLIPS.




## ASSEMBLING OPERATIONS



**FIG. 1**



- 370 ASSEMBLE UNIT (A) AND FASTEN WITH NUT (B).  
-INSERT ROCKER SHAFT (C) AND THREAD LOCK COLLAR (D) UPON THE SHAFT.-PLACE POSITIONER (E)  
370 A UPON HUB ON INNER SIDE OF LEFT-HAND SIDE FRAME.-HOOK UP SPRING (F) TO STUD (G)-PUSH  
SHAFT (C) FURTHER AND THREAD RELEASE LATCH (H) ON SHAFT.-SPREAD KEY STEMS (J) IN  
DIRECTION OF ARROWS AND ENGAGE  
YOKE (K) INTO GROOVE OF (L)  
-LINE UP TAPER HOLES AND INSERT  
PIN (M) AND TIGHTEN LOCK  
COLLAR (D) IN PLACE WITH  
.003" END PLAY.
- 
- FIG. 2

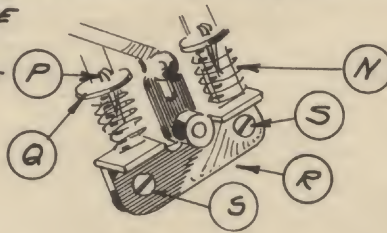


FIG. 2

- 371 ASSEMBLE STOP (P) WASHER (Q) AND SPRING (N) ON BOTH KEY STEMS.  
ASSEMBLE BRACKET (R) AND TIGHTEN SCREWS (S).

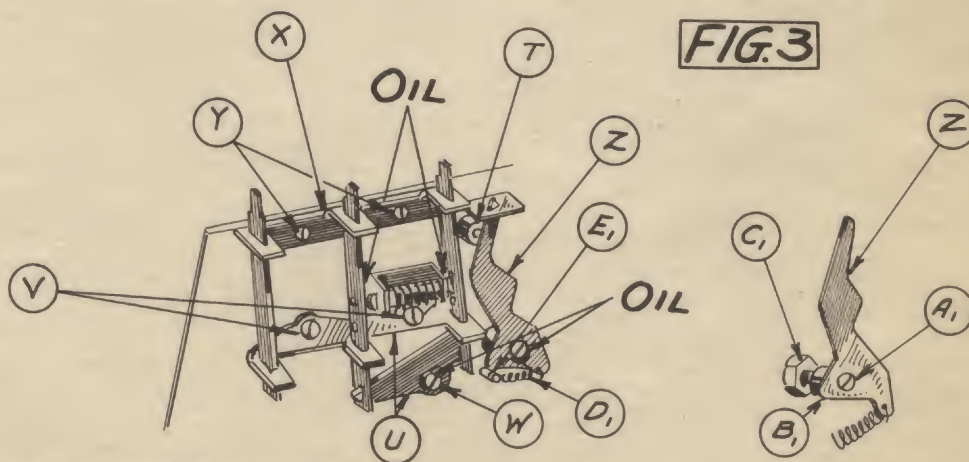


FIG. 3

372. ASSEMBLE SPACING COLLAR (T) ONTO STUD.  
 - ASSEMBLE UNIT (U) WITH SCREWS (V) - INSERT SCREW (W) AND TIGHTEN ITS NUT.  
 - ASSEMBLE BRACKET (X) AND FASTEN WITH SCREWS (Y).  
 - INSTALL THE RELEASE KICKER (Z) WITH COLLAR (B<sub>1</sub>) SCREW (A<sub>1</sub>) AND TIGHTEN NUT (C<sub>1</sub>).  
 - HOOK UP SPRING (D<sub>1</sub>) TO POST (E<sub>1</sub>).



ASSEMBLING NOTES.

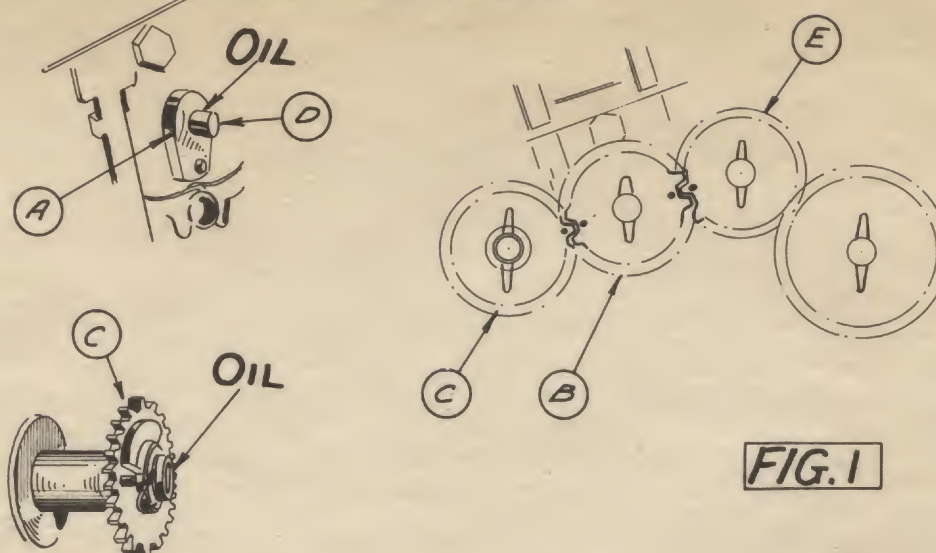


FIG. 1

- 373 ASSEMBLE CAM (A) TO STUD (D) ASSEMBLE GEAR (B) IN PROPER TIME WITH GEAR (E) REPLACE RETAINING CLIP.  
ASSEMBLE DRIVING GEAR UNIT (C) IN PROPER TIME WITH GEAR (B) AS SHOWN. - REPLACE RETAINING CLIP

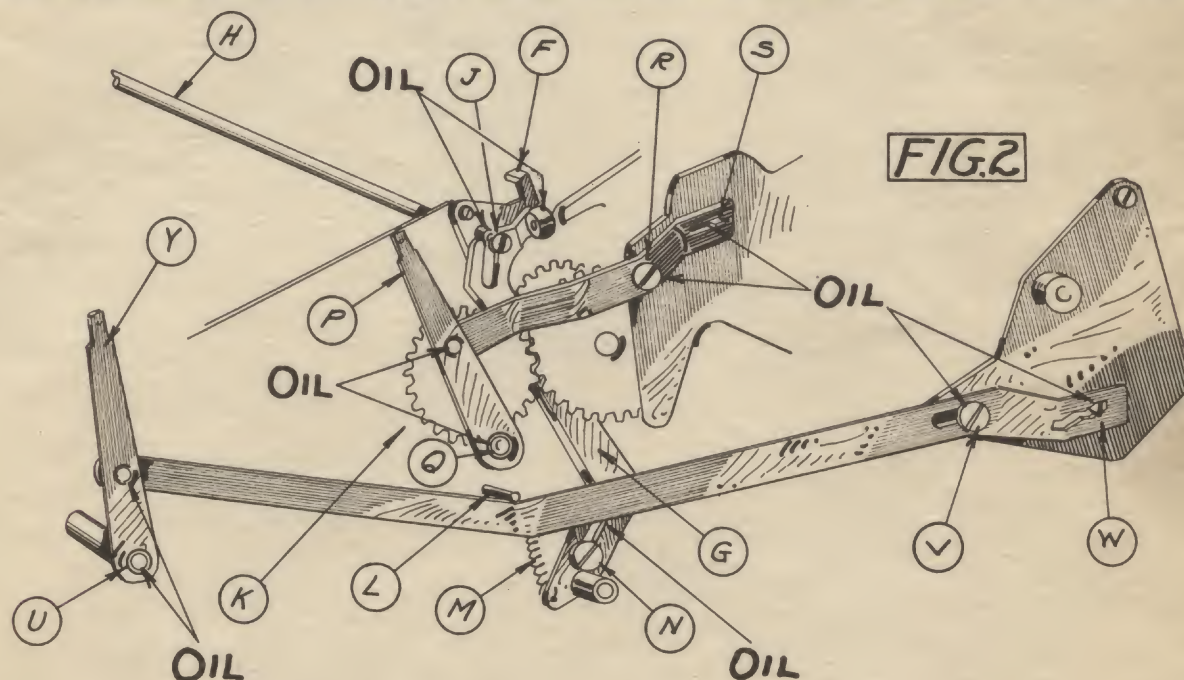


FIG. 2

- 374 TO ASSEMBLE RIGHT HAND CARRIAGE LIFTER (G) - THE GEAR (K) MUST FIRST BE TAKEN OFF -  
- ASSEMBLE RIGHT HAND SUPPORT ARM (F) ONTO FRAME - INSERT TIE ROD (H) BETWEEN SIDE FRAME. - FASTEN WITH COLLAR AND SCREW (J) - HOOK UP SPRING (M) TO STUD (L) - REPLACE GEAR (K) (DO NOT CHANGE TENSION OF SPRING (M))
- 375 ASSEMBLE SHIFT LEVER (Y) TO STUD (U) REPLACE RETAINING RING - INSERT END OF (W) INTO SLOT - FASTEN WITH SHOULDER SCREW (V).
- 376 ASSEMBLE SHIFT LEVER (P) ON STUD (R) - INSERT END OF (S) INTO SLOT. - FASTEN WITH SHOULDER SCREW (R) - REPLACE RETAINING RING.
- 377 TEST THE LEVERS FOR FREEDOM OF ACTION.



- 378 ASSEMBLE THE REAR CARRIAGE LOCK LATCH GUIDE BLANKS.  
- PLACE RIGHT (A) AND LEFT (B) GUIDES UPON INSIDE OF FRAMES.

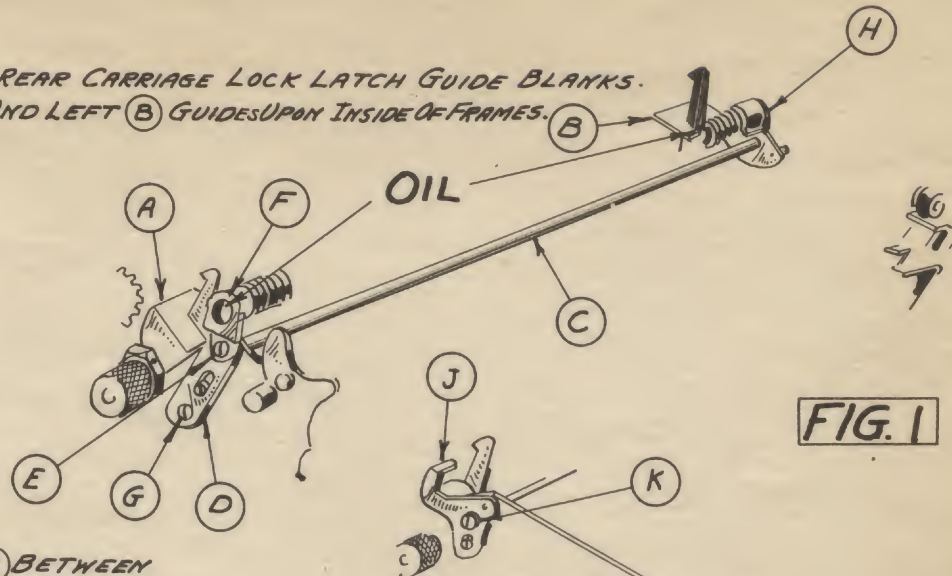


FIG. 1

- 379 PLACE TIE ROD (C) BETWEEN THE GUIDES (A) AND (B).

- 380 ASSEMBLE THE LEFT FRONT HINGE ROD BEARING (D) WITH FELT OILER (F) AND FASTEN WITH SCREW (E).  
- FASTEN SCREW (G).

- 381 REPEAT THE SAME OPERATION FOR RIGHT FRONT HINGE ROD BEARING (H).

- 382 ASSEMBLE THE LEFT HAND SUPPORT ARM (J) WITH SCREW (K).

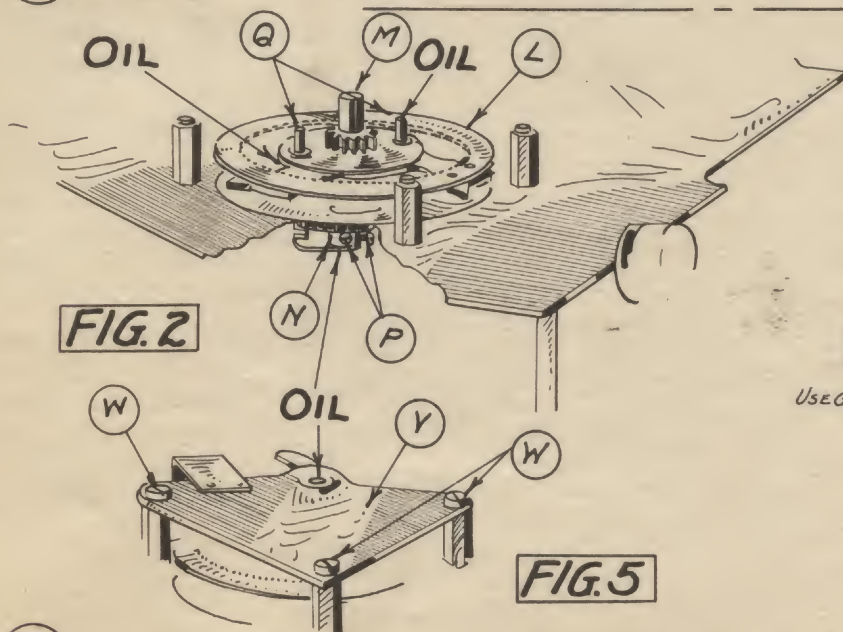


FIG. 2

FIG. 3

FIG. 4

FIG. 6

- 383 TO ASSEMBLE THE TRANSMISSION PLACE UNIT (L) INTO RECESS IN LEFT HAND SIDE FRAME, INSERT SUN PINION (M) AND ATTACH DRIVING ARM (N) WITH TWO SCREWS (P) ALLOW .003" END PLAY. ASSEMBLE GEARS (R) ONTO STUDS (Q); TIMING THEM SO THAT THE DOT (S) APPEARS IN THE CENTER OF THE PEEP HOLES.  
- ASSEMBLE THE WASHER (T) ON SHAFT (M) - ASSEMBLE SUBTRACTION SUN GEAR (U) IN MESH.  
- ASSEMBLE PLATE (Y) WITH SCREWS (W) - TEST UNIT FOR FREEDOM OF MOTION.



## ASSEMBLING OPERATIONS

FIG. 1

- 384 ASSEMBLE BLANK (A) TO SIDE FRAME AND HOOK UP SPRING (B).  
NOTE: BE SURE PIN (K) IS IN POSITION SHOWN.

- 385 ASSEMBLE WASHER (C), STOPPING LEVER (D) AND LATCH (F) AND FASTEN WITH SCREW (E) ON SIDE FRAME.

- 386 ASSEMBLE THE CYCLE STOPPING ARM (G) ON SIDE FRAME AS SHOWN AND HOOK UP SPRING (H) TO POST (J).

- 386 A ASSEMBLE GUIDE BLANK (L) AND PIN BRACKET (L<sub>1</sub>) TO SIDE FRAME AND FASTEN WITH SCREWS (M).

- 387 ASSEMBLE THE ADJUSTING BRACKET (N). BE SURE THAT RACE (X) AND BALLS (P) ARE IN PLACE. FASTEN WITH SCREWS (Y).

- 388 PLACE WASHER (T) ON SHAFT (W) - INSERT THE SHAFT (W) OF THE ROCK LEVER INTO HOLE (Q) - THREAD COLLAR (U) UPON SHAFT - PUSH SHAFT HOME - FASTEN LOCK COLLAR (U) WITH SCREW (V), ALLOWING ABOUT .003 PLAY.

- 389 HOOK UP CONNECTING LINK (S) TO STUD (R) - ASSEMBLE WASHER (Z) AND REPLACE RETAINING RING.

FIG. 3

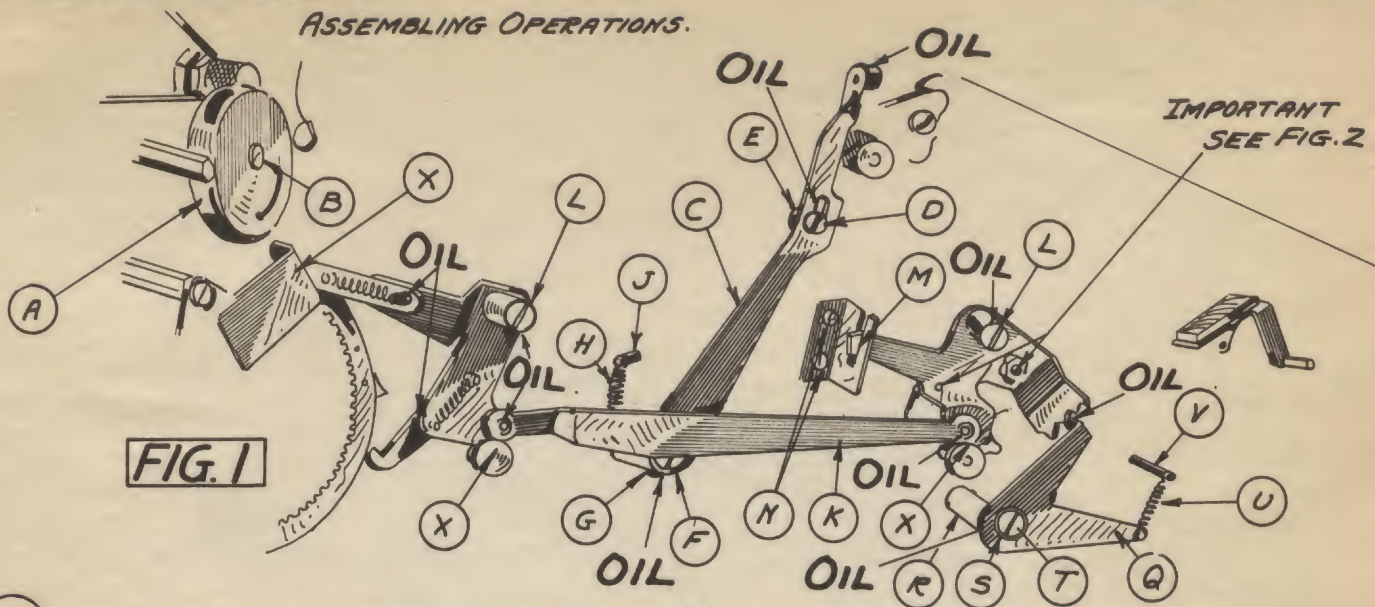
- 390 ASSEMBLE QUICK STROKE (AA) TO POST (BB) - HOOK UP SPRING (DD) TO POST (CC) - REPLACE RETAINING RING.

FIG. 4

- 391 PLACE LIFTER (EE) BETWEEN STUDS (FF) AND ASSEMBLE WITH LOCATOR ARM (GG) TO STUDS (HH) AND (JJ) REPLACE RETAINING RING ON STUD (HH) - ASSEMBLE WASHER (KK) TO STUD (JJ) AND REPLACE RETAINING RING.



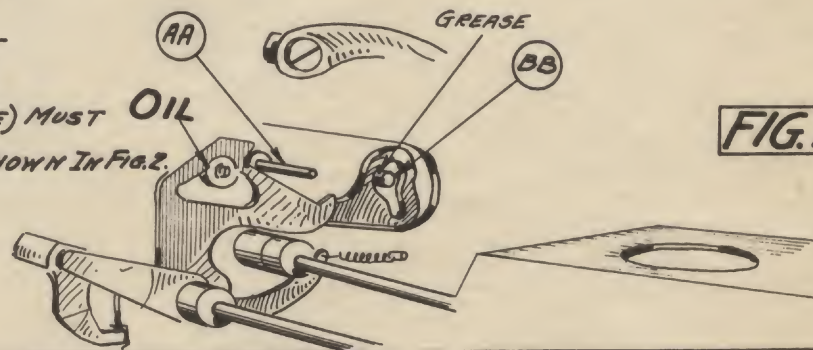
## ASSEMBLING OPERATIONS.



- 392 ASSEMBLE THE REAR BELL (A) WITH SCREW (B)  
- PLACE LEFT HAND CARRIAGE LIFTER (C) ONTO LEFT HAND SIDE PLATE IN POSITION SHOWN. PLACE COLLAR (E) AND FASTEN WITH SCREW (D) - PLACE COLLAR (G) AND FASTEN WITH SCREW (F) HOOK UP SPRING (H) TO POST (J). - NOTE - DO NOT CHANGE THE TENSION OF SPRING (H).
- 393 PLACE UNIT (K) INTO THE GUIDES MARKED (X) AS SHOWN AND FASTEN WITH SCREWS (L).
- 394 ASSEMBLE GUIDE (M) TO SIDE FRAME WITH SCREWS (N).
- 395 ASSEMBLE THE UNIT (Q) AS SHOWN WITH COLLAR (R) ECCENTRIC (S) AND FASTEN WITH SCREW (T) HOOK UP SPRING (U) TO POST (V).
- 396 TEST THESE PARTS FOR FREEDOM OF MOTION.

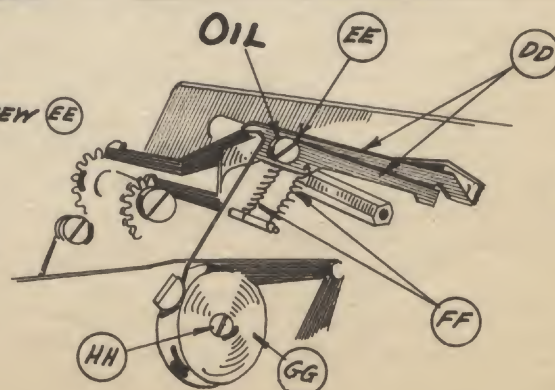
- IMPORTANT -

- 397 PINS (AA) AND (BB) (BOTH IN CLUTCH YOKE) MUST BE IN POSITIONS SHOWN IN FIG. 2.



- 398 ASSEMBLE OVERCARRY TRIP LEVER AND FLEXIBLE END (DD) TO SIDE FRAME WITH SCREW (EE)  
- HOOK UP SPRINGS (FF).

- 399 ASSEMBLE THE BELL (GG) WITH SCREW (HH).





## ASSEMBLING AND ADJUSTMENT NOTES - SELECTING BAILS -

400 THE ASSEMBLING OF THE SELECTING BAILS ON THIS MODEL IS SIMILAR TO THE ASSEMBLING OF BAILS SHOWN ON PLATE 52 OPERATION (347) (348) BULLETIN \*34 BUT IT IS ADVISABLE TO START THE ASSEMBLING AT THE RIGHT HAND WITH FOUR SETS AND THEN CONTINUE FROM THE LEFT HAND SIDE AND FINISH TOWARD THE CENTER.

401 SWING BACK THE BRACE (R) PLATE 41 - THIS BULLETIN - IN PLACE AND INSERT SCREWS.



FIG. 2

LEFT HAND SIDE OF MACHINE

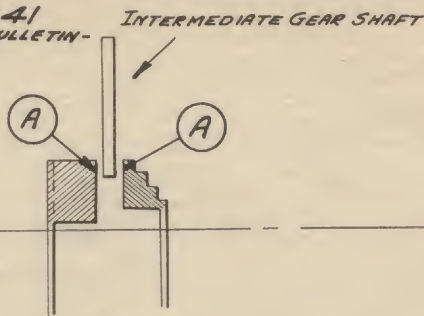
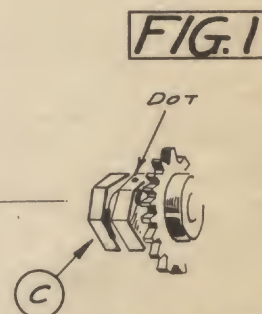


FIG. 3



RIGHT HAND SIDE OF MACHINE

402 THE LEFT ENDS OF THE SELECTING GEAR SHAFTS ARE SUPPLIED WITH A SIDEWISE ADJUSTMENT KNOB (B); ADJUST THIS KNOB UNTIL THE SHAFT HAS .003" END PLAY. CHECK UP THE CLEARANCE SHOWN AS (A) FIG. 3 ON EACH SET OF GEARS.

403 THE IDEAL CONDITION IS AS SHOWN AT (A) - IF THE SHAFT AS A WHOLE NEEDS ADJUSTMENT TO THE RIGHT REMOVE STOCK FROM FACE OF NUT (C) AND READJUST KNOB (B) TO COMPENSATE. - IF THE SHAFT AS A WHOLE NEEDS ADJUSTMENT TOWARD THE LEFT - INSERT A WASHER BETWEEN NUT (C) AND BODY OF SHAFT AND READJUST KNOB (B) TO COMPENSATE.

404 IMPORTANT - IF THE ORIGINAL ADJUSTMENT OF EITHER SELECTING GEAR SHAFT IS DISTURBED IT NECESSITATES READJUSTING THE KEYBOARD ALIGNMENT.

405 THE REAR CARRYING SHAFT IS SUPPLIED WITH AN ADJUSTING KNOB (B) FOR ADJUSTING THE END PLAY - FIG. 4.

406 IF FURTHER ADJUSTMENT IS NECESSARY THE SAME METHOD IS EMPLOYED AS APPLIED TO THE SELECTING GEAR SHAFTS. SEE ALSO PLATE 44 BULLETIN \*34.

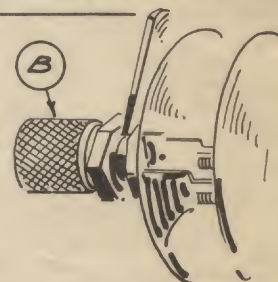


FIG. 4

407 THE FRONT CARRYING SHAFT IS ADJUSTED IN SAME MANNER AS THE REAR CARRYING SHAFT; EXCEPT THAT ADJUSTING KNOB (E) IS SCREWED IN AND OUT TO EFFECT THE END PLAY OF THE SHAFT.

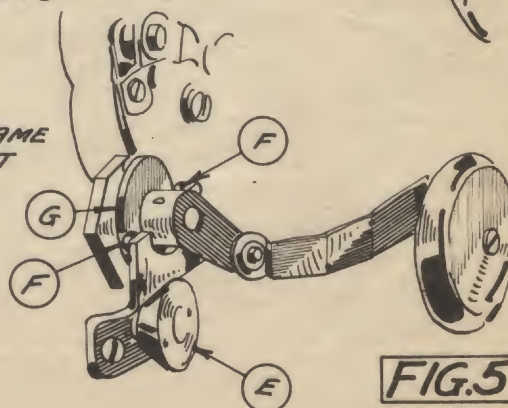


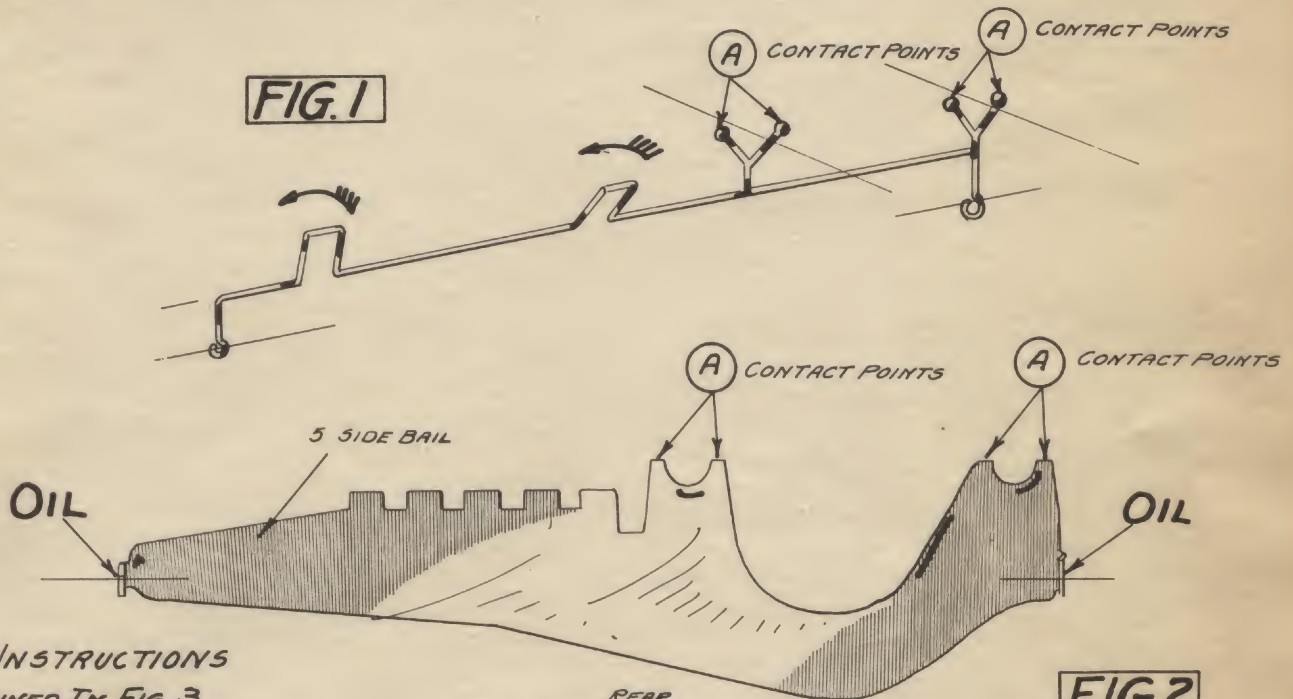
FIG. 5

408 NOTE - BALLS (F) MUST BEAR EVENLY UPON COLLAR (G).

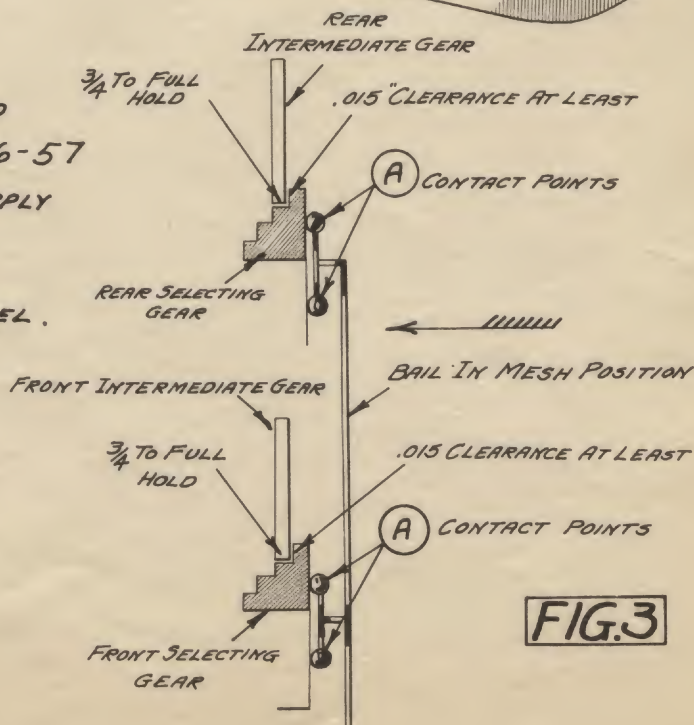


## ADJUSTMENT NOTES - BASE.

- 409 IN MACHINE SERVICE BULLETIN NO. 34 PLATE 53-54-55-56-57 WILL BE FOUND ILLUSTRATIONS AND COMPLETE DESCRIPTION ON HOW TO ALIGN THE KEYBOARD AND BAILS NOT ONLY IN PRACTICE BUT ALSO IN THEORY.
- 410 THESE SAME PRINCIPLES AND ADJUSTMENTS APPLY TO THIS MODEL MA. 213 WITH THE EXCEPTION THAT TWO SETS OF SELECTING GEARS ARE CONTROLLED BY THE DEPRESSION OF ONE KEY.
- 411 THEREFORE THE YOKE POINTS (A) ON THE BAIL MUST MOVE THE FRONT AND REAR SELECTING GEARS IN UNISON AS SHOWN FIG. 1.



- 412 THE INSTRUCTIONS CONTAINED IN FIG. 3 IN CONJUNCTION WITH ADJUSTMENT NOTES FOUND ON PLATE 53-54-55-56-57 BULLETIN #34 - SHOULD SUPPLY ALL NECESSARY INFORMATION TO ADJUST THE BAILS OF THIS MODEL.

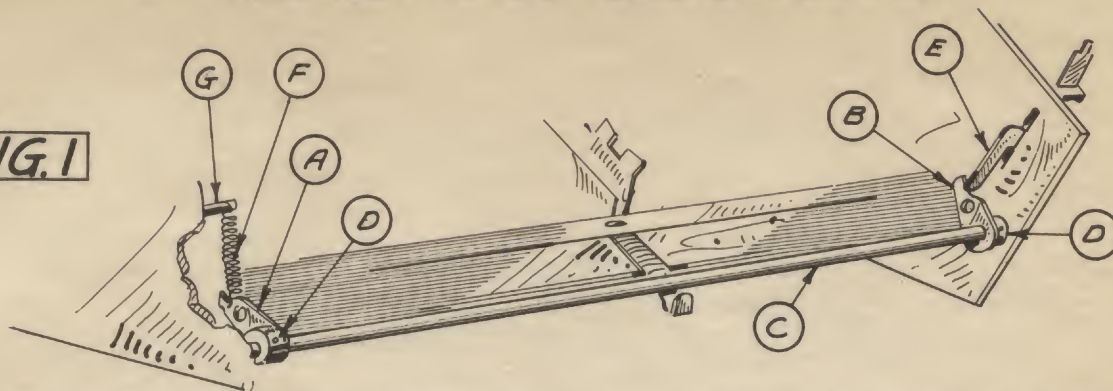


**FIG. 3**



## ASSEMBLY NOTES - BASE OF MACHINE

**FIG. 1**

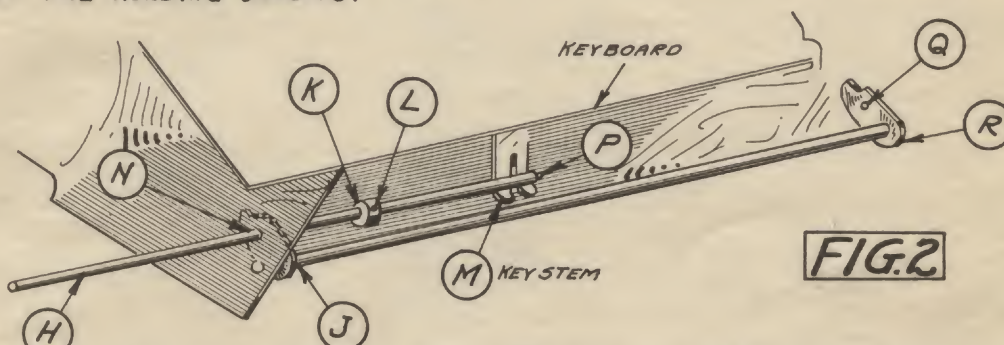


413 INSERT SHAFT (C) INTO ONE SIDE FRAME, - THREAD PARTS (A) AND (B) UPON IT - ASSEMBLE SHAFT - INSERT PINS (D) PLACE (E) AS SHOWN - HOOK UP SPRING (F) TO (G).

414 ASSEMBLE THE HAND CUT-OUT CAM MECHANISM AND ADJUST - SEE PLATE 69 BULLETIN #34.

396  
A

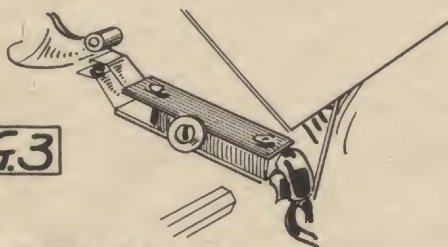
415 ASSEMBLE THE KEYBOARD AS A UNIT (WITH CARRIAGE SHIFTER ROD IN PLACE) IN MACHINE AND INSERT THE HOLDING SCREWS.



**FIG. 2**

416 DEPRESS ALL ZERO KEYS. - THREAD SHAFT (H) INTO HOLE (N) IN LEFT HAND SIDE FRAME AND ALSO INTO HOLE IN ARM (J) - THREAD COLLAR (K) ON SHAFT - ADVANCE THE SHAFT TO RIGHT - OVER THE KEY STEM ENDS (M) AND LOCATE END (P) INTO HOLE (Q) IN BLANK (R). PLACE COLLAR (K) AGAINST RIGHT HAND ARM (J) AND FASTEN WITH SCREW (L) - ALLOW ABOUT .003" END PLAY.

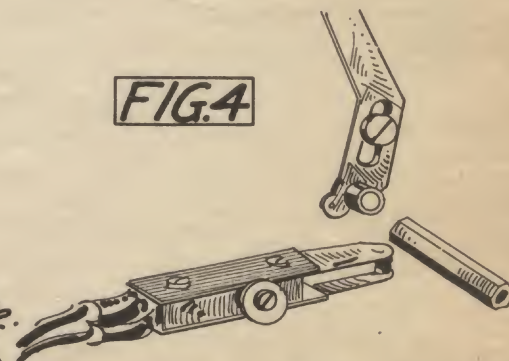
**FIG. 3**



417 ASSEMBLE THE REGULAR STOP AND START SWITCH AS SHOWN, TO LEFT HAND SIDE FRAME.

- FOR ADJUSTMENT SEE SUPPLEMENTARY BULLETIN 36C SHEET #2.

**FIG. 4**



418 ASSEMBLE THE CIRCUIT BREAKER FIG. 4 AS SHOWN, ADJUST SO THAT THERE IS A SLIGHT PRESSURE ON LOWER BLADE WHEN CARRIAGE IS IN MESH.

419 NOTE - THE WEIGHT OF THE CARRIAGE WHEN ON MACHINE CLOSES THIS CONTACT. IF CARRIAGE IS RAISED OR OFF THE MACHINE MOTOR WILL NOT RUN.



## POWER UNIT - DIAGRAM AND ADJUSTMENTS.

420 FIG. 1 IS A DIAGRAM OF THE CIRCUIT BETWEEN CIRCUIT BREAKER, STOP AND START SWITCH AND THE CONTACT POINTS.

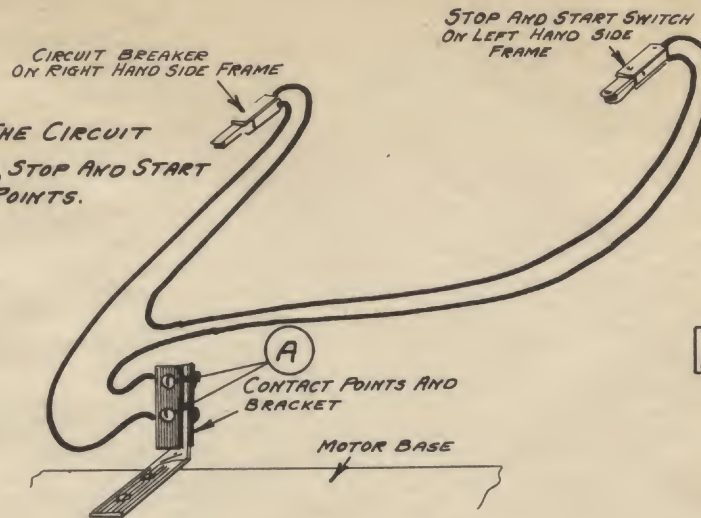


FIG. 1

421 FIG. 2 IS A DIAGRAM OF THE POWER UNIT. WHEN INSERTING THE POWER UNIT IN PLACE IN THE MACHINE POSITIVE CONTACTS MUST BE MAINTAINED BETWEEN CONTACT SCREWS (A) AND SPRING CONTACTS (B).

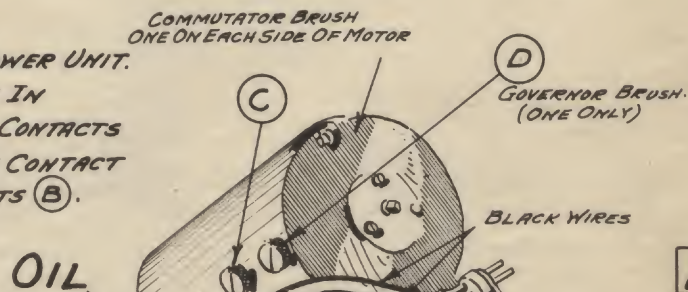
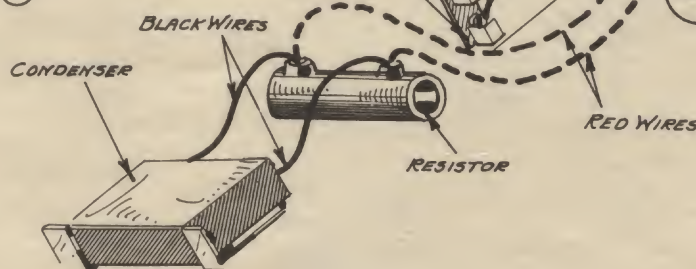


FIG. 2

422 COMMUTATOR AND GOVERNOR BRUSHES MAY BE SERVICED BY REMOVING SCREW CAPS (C) AND (D).



423 INSULATION MUST BE MAINTAINED AT THIS POINT. SEE MACHINE SERVICE BULLETIN #113.

424 THIS MOTOR IS SUPPLIED WITH AN ADJUSTING SCREW (E) TO REGULATE THE SPEED OF THE MACHINE. INCREASE TURN CLOCKWISE, DECREASE TURN COUNTER-CLOCKWISE.

SEE ALSO SERVICE BULLETIN #99

IF ADJUSTING SCREW (E) IS TOO LOOSE TIGHTEN SCREWS (F) IF IT IS TIGHT LOOSEN.

FIG. 3

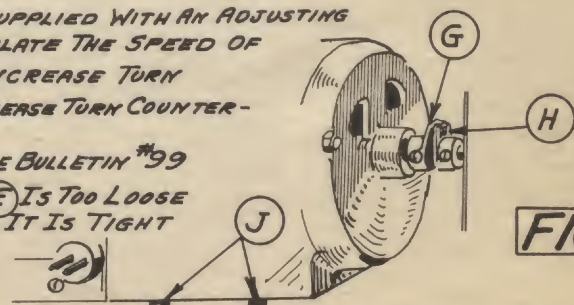
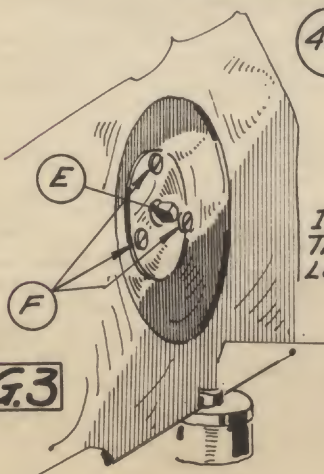


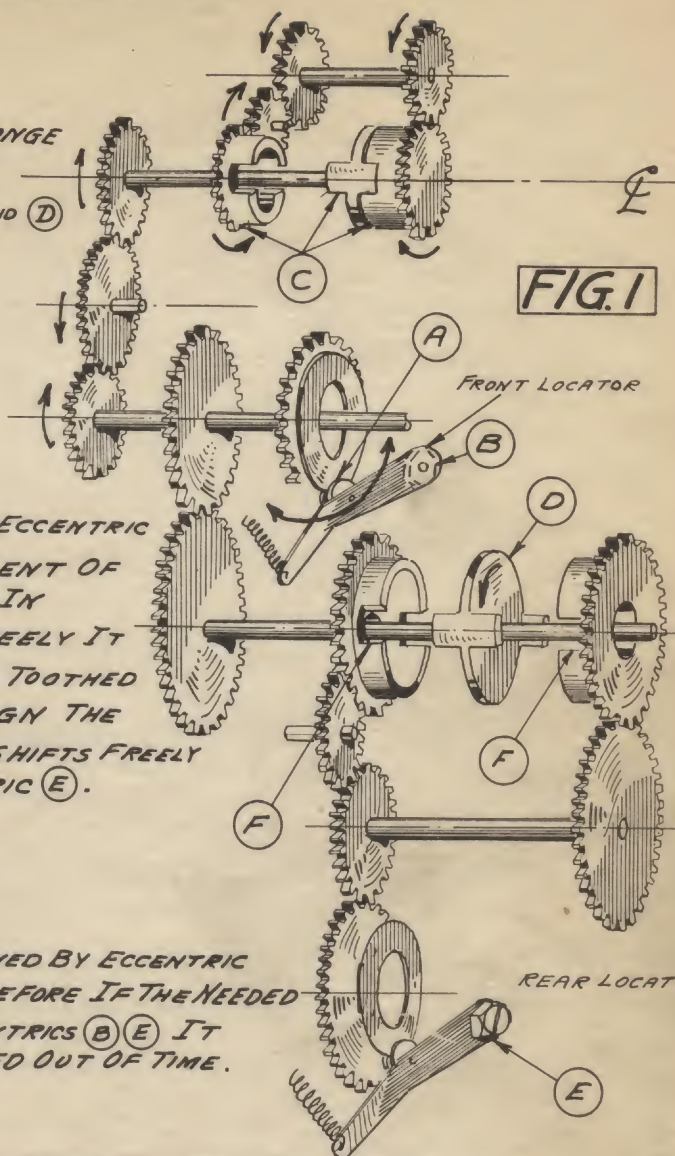
FIG. 4

425 PLACE MOTOR IN MACHINE WITH LUG (G) IN SLOT OF ARM (H) FASTEN WITH MOTOR BOLTS (J) TO CROSS BRACE OF BASE. - DO NOT FORGET LOCKWASHERS.



FUNCTIONING ADJUSTMENTS.

- 426 NOTE- IN ORDER TO OPERATE THE CHANGE LEVERS (Y) (P) PLATE 57 FIG. 2 IT IS NECESSARY THAT THE CLUTCHES (C) AND (D) ARE IN ALIGNMENT.



- 427 ADJUSTING THE ROLL (A) BY MEANS OF ECCENTRIC ADJUSTMENT (B) CONTROLS THE ALIGNMENT OF CLUTCH UNIT (C) WHEN THIS CLUTCH IS IN ADJUSTMENT SO THAT IT OPERATES FREELY IT HAS DETERMINED THE POSITION OF THE TOOTHED MEMBER OF CLUTCH UNIT (D). - TO ALIGN THE NOTCHES (F) OF THIS UNIT SO THAT IT SHIFTS FREELY IT IS NECESSARY TO ADJUST ECCENTRIC (E).

NOTE- THE MAXIMUM MOVEMENT OBTAINED BY ECCENTRIC ADJUSTMENTS (B) AND (E) IS LIMITED; THEREFORE IF THE NEEDED ADJUSTMENT IS BEYOND THE RANGE OF THE ECCENTRICS (B) (E) IT INDICATES THAT THE GEAR TRAIN IS MESHED OUT OF TIME.

- 428 TO ADJUST AND ALIGN THE COUNTING AND CARRYING FINGERS. SEE PLATE 7-FIG. 35-36-37-38 SERVICE BULLETIN #24.

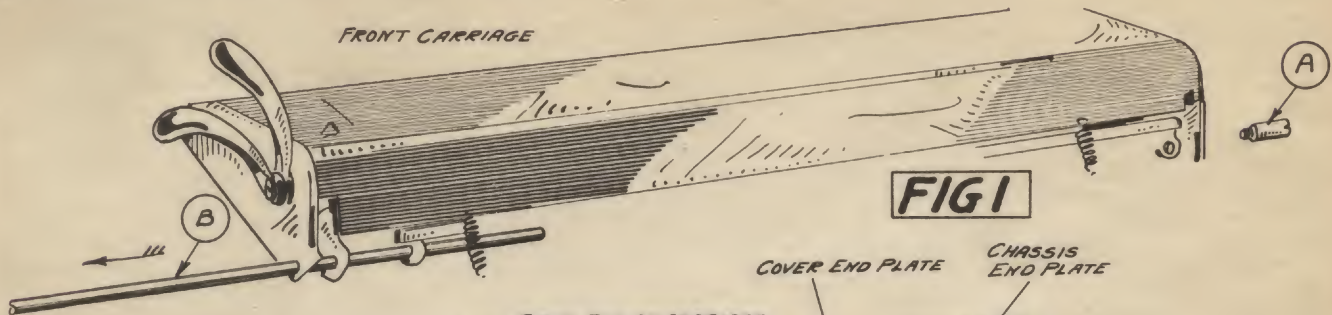
- 429 FOR FUNCTIONING AND ADJUSTMENTS OF THE AUTOMATIC MECHANISM ON LEFT HAND SIDE FRAME-SEE PLATES 63-64-65-66-67-68-70 (A) BULLETIN #34.

- 430 THE REASSEMBLING OF SUCH PARTS AS KEY TOPS, SHIFT LEVER KNOB, PLUS AND MINUS BARS, BOTTOM PAN, CASE AND FEET OFFERS NO PROBLEMS AND CAN BE EASILY EFFECTED.

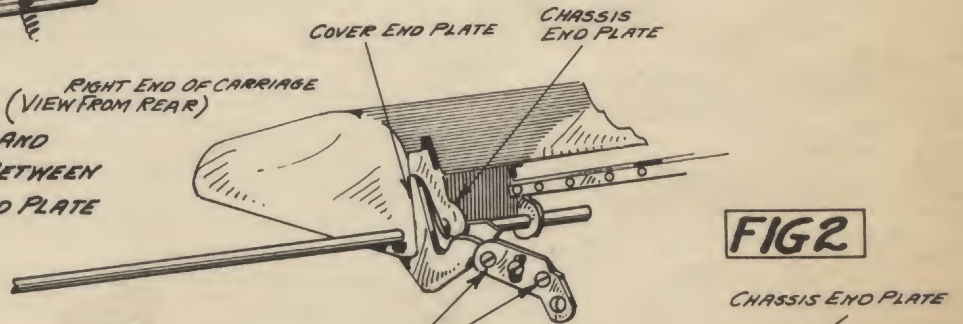


# HOW TO PLACE CARRIAGES UPON THE BODY OF MACHINE. **PLATE 66** **MODEL MA 213**

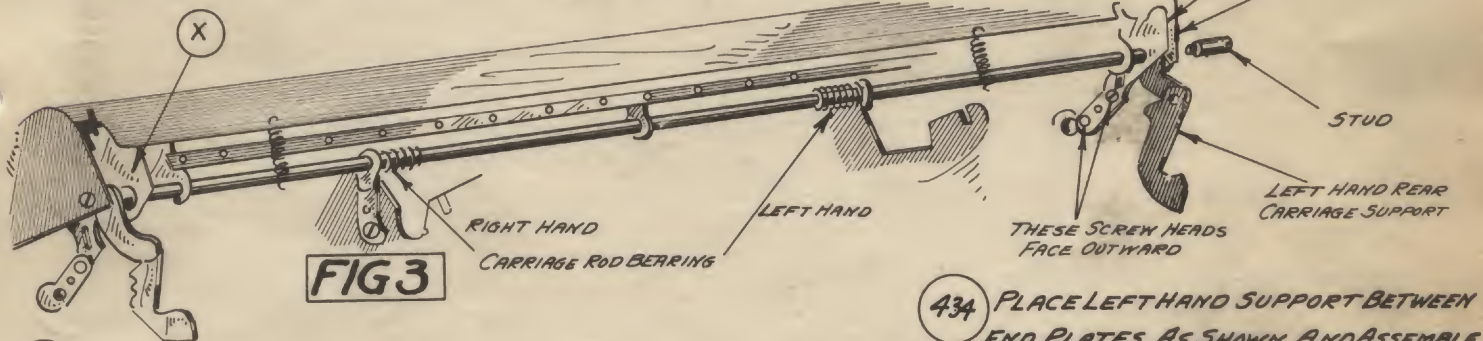
- 431 REMOVE STUD (A) AND HINGE ROD (B) FIG 1.



- 432 SELECT THE PROPER SUPPORT AND THREAD IT WITH THE SUPPORT BETWEEN COVER END PLATE AND CHASSIS END PLATE AS SHOWN IN FIG 2.



- 433 PLACE CARRIAGE UPON MACHINE. INSERT ROD THROUGH CARRIAGE BEARINGS UNTIL IT HITS CHASSIS END PLATE.

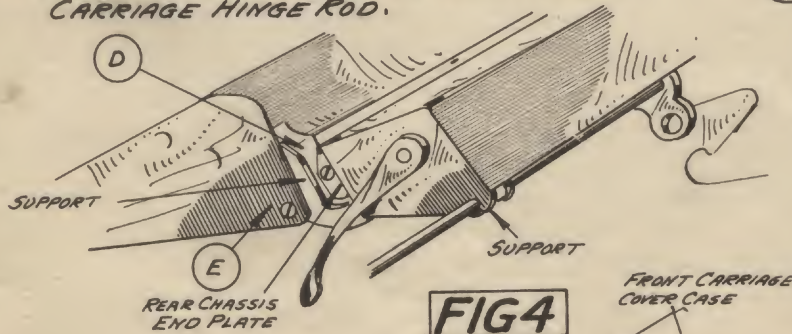


- 434 PLACE LEFT HAND SUPPORT BETWEEN END PLATES AS SHOWN AND ASSEMBLE STUD IN PLACE.

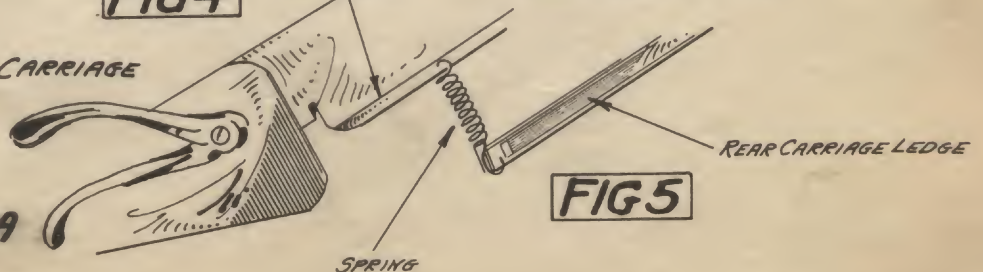
- 436 PLACE THE REAR CARRIAGE INTO THE MACHINE IN ALIGNMENT WITH THE FRONT CARRIAGE. REAR CARRIAGE CHASSIS END PLATES INSERTED BETWEEN FRONT CARRIAGE END PLATES (D) AND COVER END PLATE (E).

SWING UP THE RIGHT HAND SUPPORT AND THREAD IT WITH HINGE ROD. PUSH HINGE ROD THROUGH CARRIAGE BEARINGS UNTIL IT HITS CHASSIS END PLATE. SWING UP THE LEFT HAND SUPPORT AND INSERT STUD.

- 435 REMOVE STUD AND WITHDRAW COMPLETELY THE REAR CARRIAGE HINGE ROD.



- 437 HOOK UP SPRINGS ON FRONT CARRIAGE COVER CASE TO LEDGE OF REAR CARRIAGE AS SHOWN (BOTH SIDES).



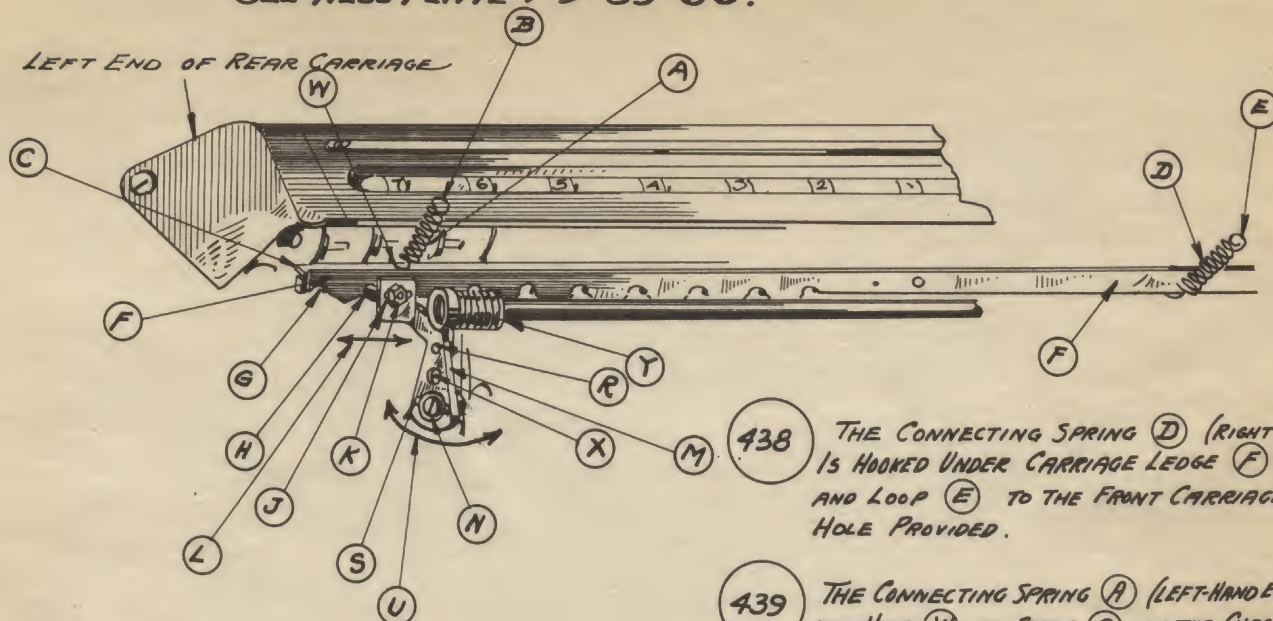
**SEE ALSO PLATE 66A**

-THIS BULLETIN-



REAR CARRIAGE ADJUSTABLE LOCKING STUD.

SEE ALSO PLATE 1-9-39-66.



438 THE CONNECTING SPRING (D) (RIGHT-HAND END) IS HOOKED UNDER CARRIAGE LEDGE (F) AS SHOWN, AND LOOP (E) TO THE FRONT CARRIAGE CASE IN HOLE PROVIDED.

439 THE CONNECTING SPRING (A) (LEFT-HAND END) IS HOOKED INTO HOLE (W) IN STRIP (C) OF THE CHASSIS AND LOOP (B) TO THE FRONT CARRIAGE CASE, IN HOLE PROVIDED.

440 THE REAR CARRIAGE IS PROVIDED WITH A LOCK LEDGE (F) WHICH CONTAINS SCALLOPS (G) - THESE SCALLOPS AND STUD (H) WILL HOLD THE PROPER POSITION OF THE CARRIAGE.

441 STUD (H) MAY BE ADJUSTED IN DIRECTION OF ARROW (L) BECAUSE OF SLOT (J) AND NUT (K). STUD (H) MAY BE ADJUSTED UP AND DOWN - (INDICATED BY ARROW (U)) BY USE OF SCREW (N) IN SLOT (S).

442 THE BRACKET (M) HOLDING THE STUD (H) IS FASTENED TO FACE OF LEFT FRONT CARRIAGE HINGE ROD BEARING (Y) AS SHOWN - USING SCREW (R) AS FULCRUM FOR ADJUSTMENT OF SCREW (N) IN SLOT (S) - A PEEP HOLE (X) IS PROVIDED IN BRACKET (M) TO ALLOW FOR THE ADJUSTMENT OF THE HINGE ROD.

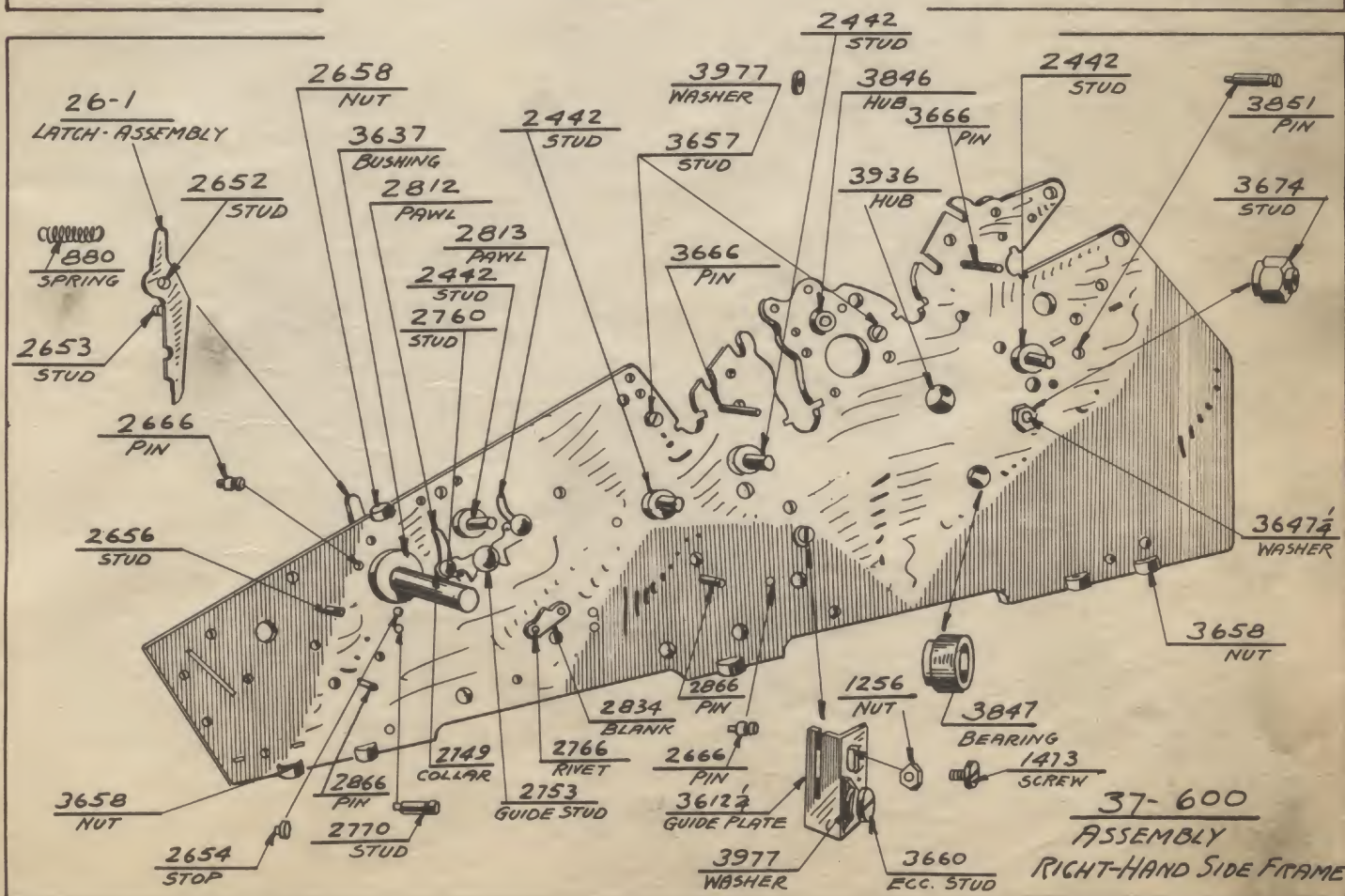
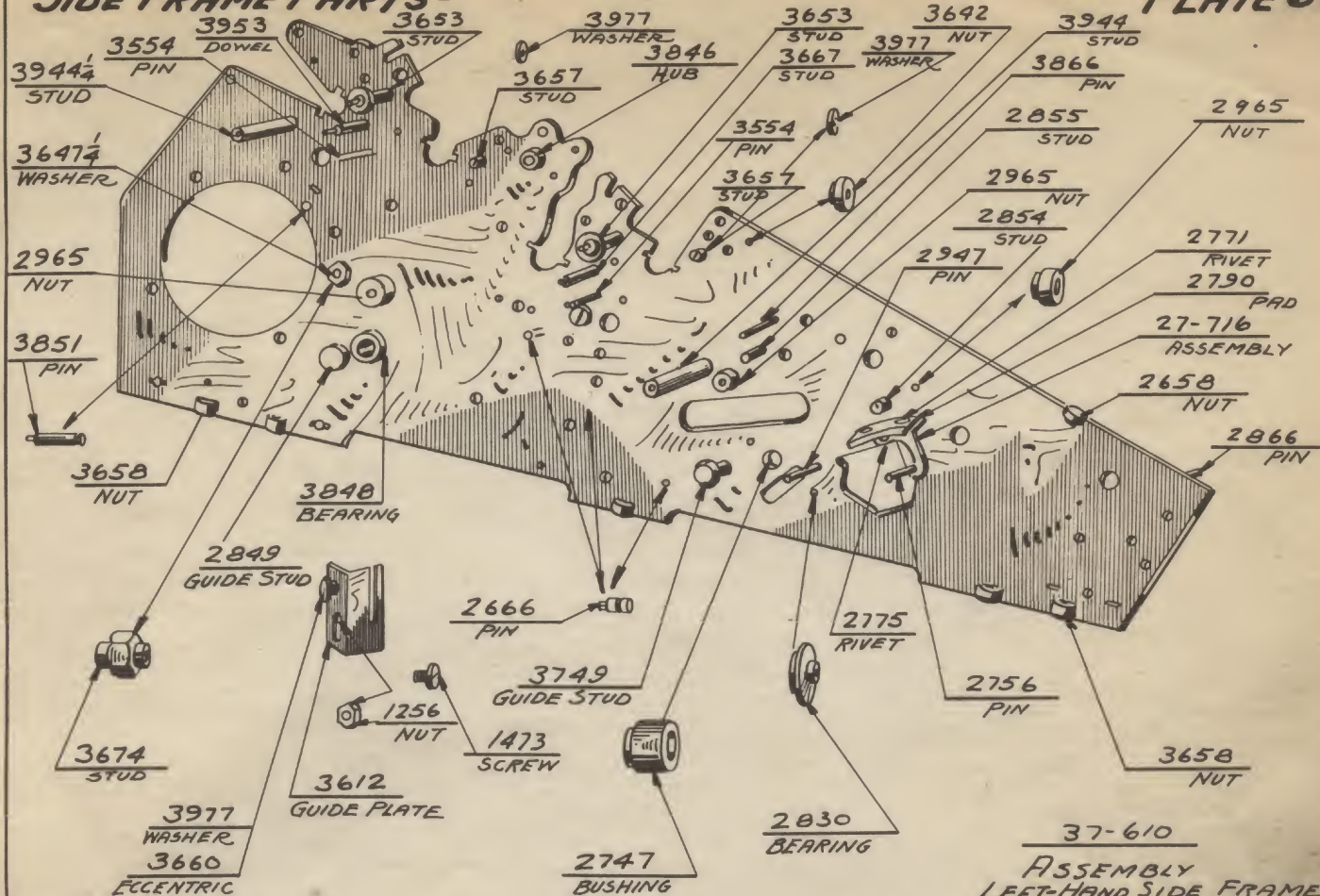
**- IMPORTANT NOTE -**

443 THIS MECHANISM SERVES ONLY TO LOCK THE PREVIOUS ADJUSTMENTS OF THE REAR CARRIAGE THEREBY PREVENTING THOSE ADJUSTMENTS FROM BEING DISTURBED WHEN THE CARRIAGE IS SHIFTED - THEREFORE - ALL OF THE FRONT AND REAR CARRIAGE ADJUSTMENTS, AS TO POSITION AND MESH, MUST BE COMPLETED BEFORE LOCKING STUD MECHANISM IS PERMANENTLY POSITIONED.



# **SIDE FRAME PARTS-**

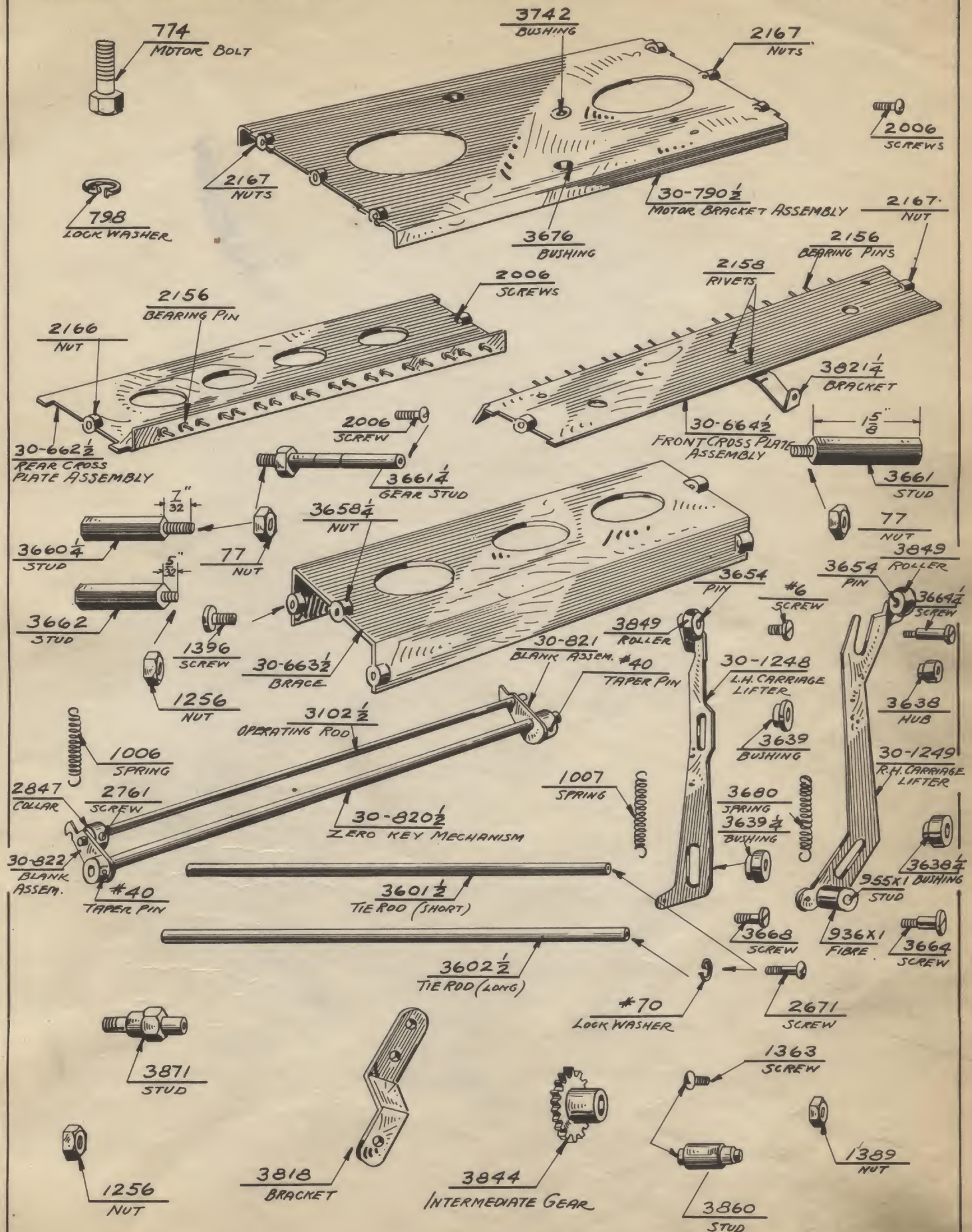
**PLATE 67**





# BODY of MACHINE - PARTS

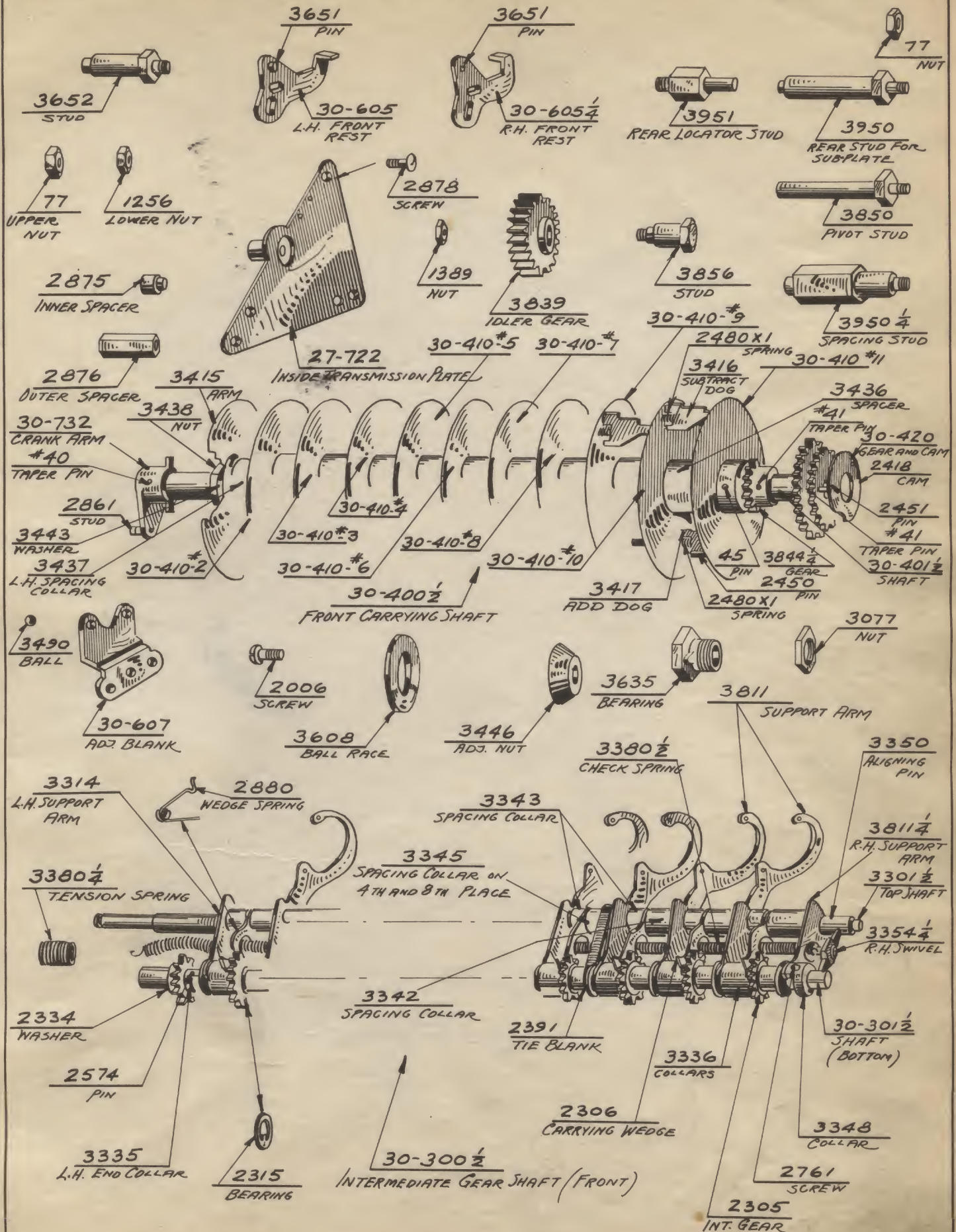
PLATE 68





# BODY of MACHINE - PARTS.

PLATE 69





# BODY OF MACHINE - PARTS

PLATE 70

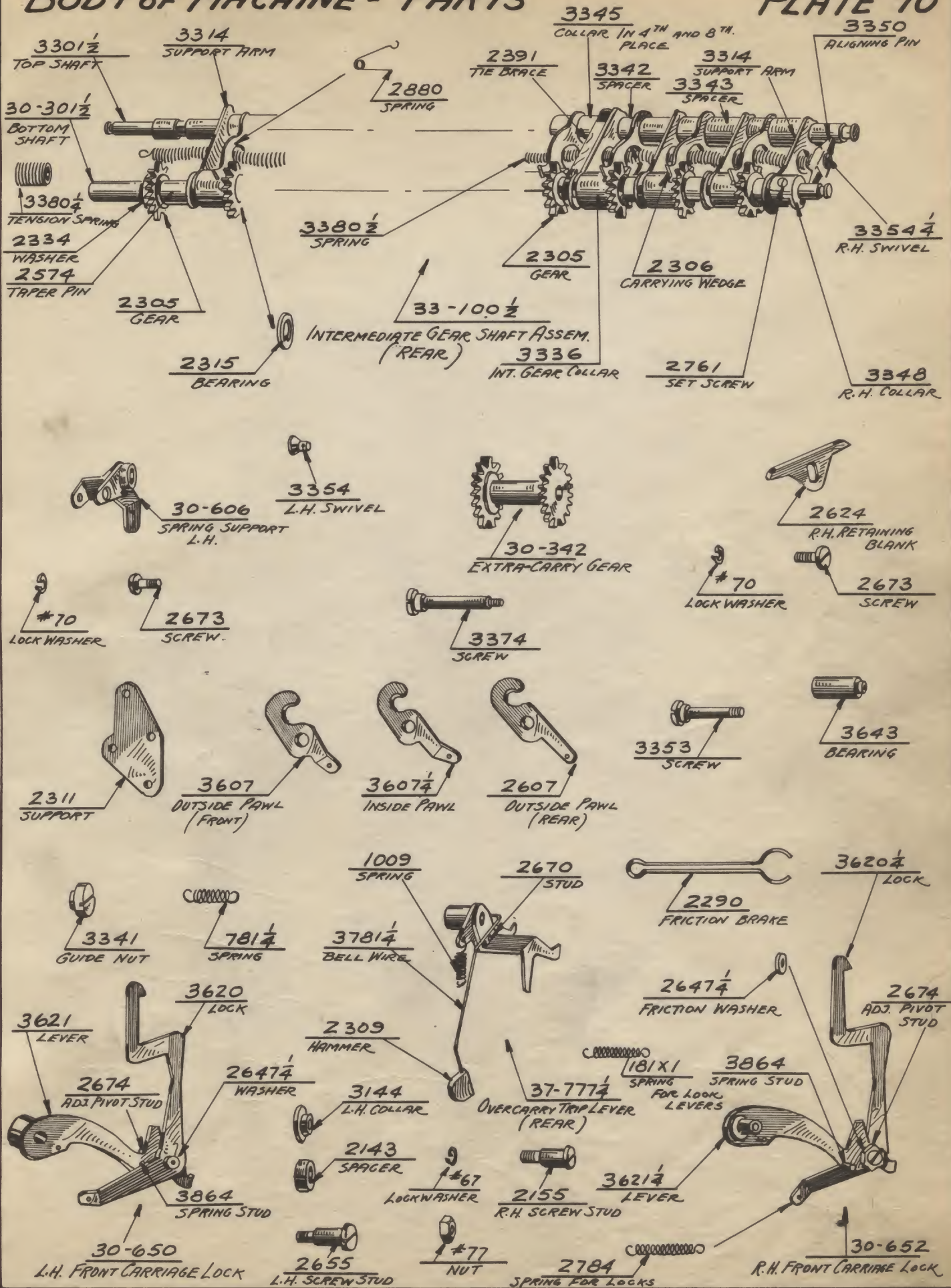
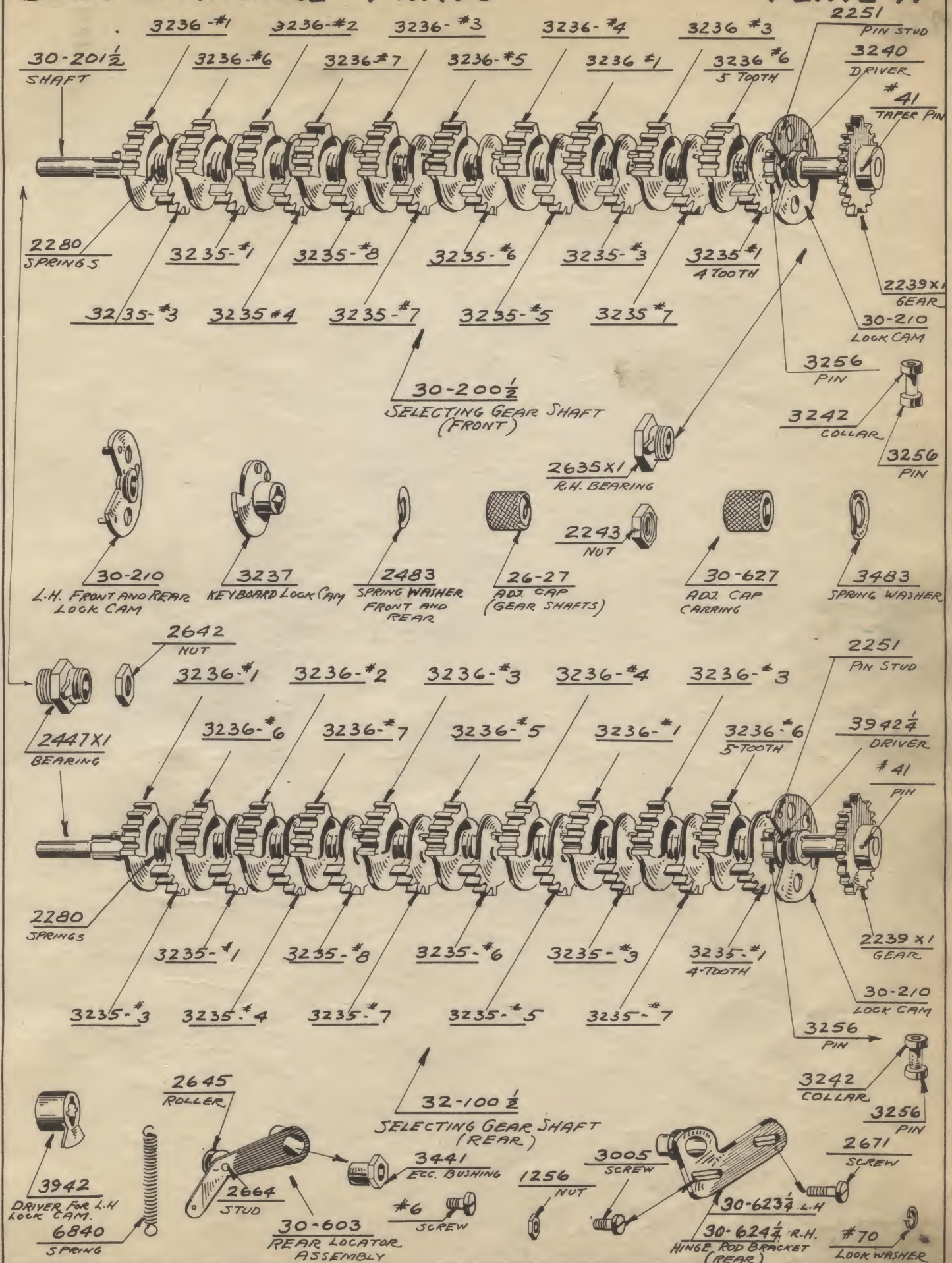




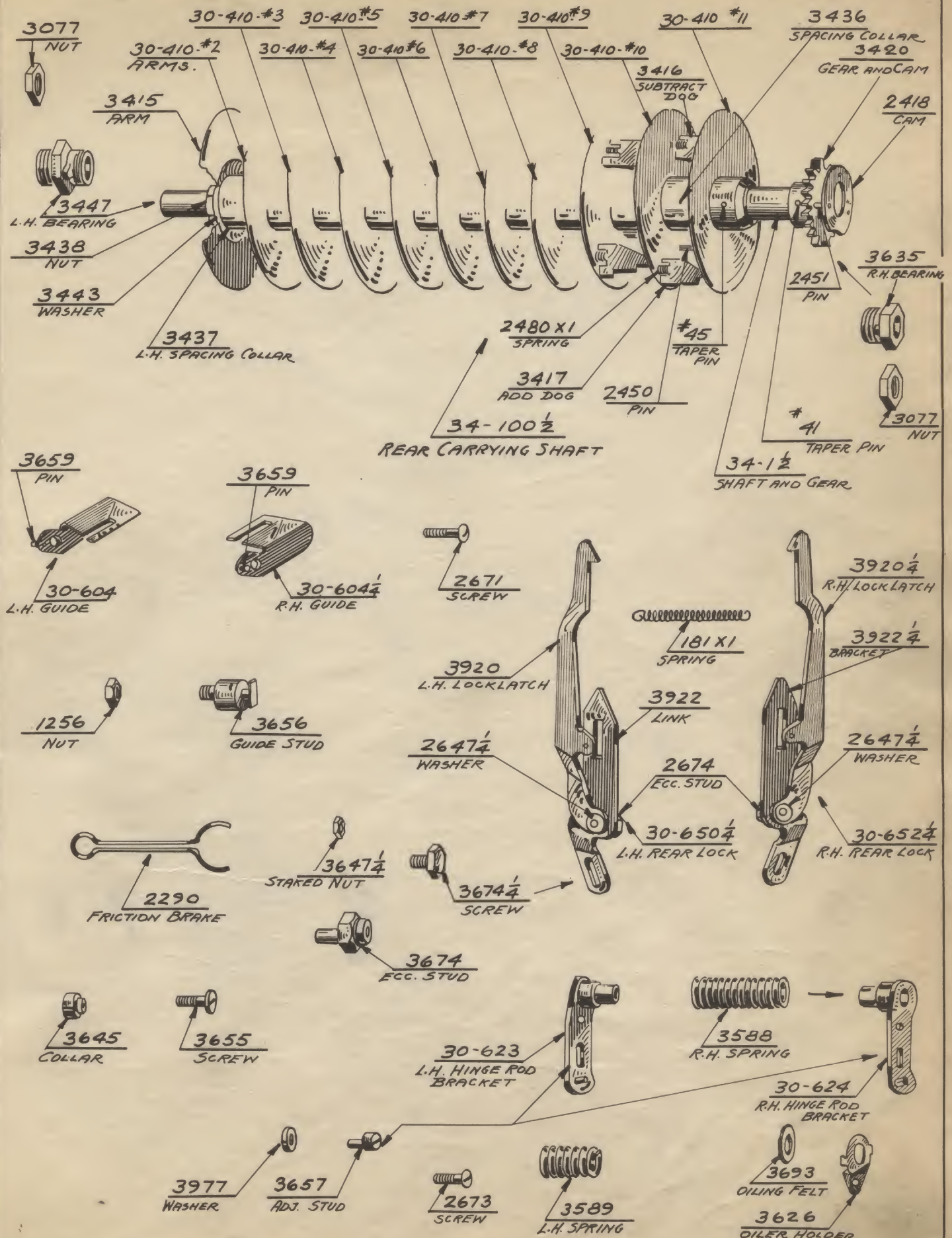
PLATE 71





# BODY OF MACHINE - PARTS

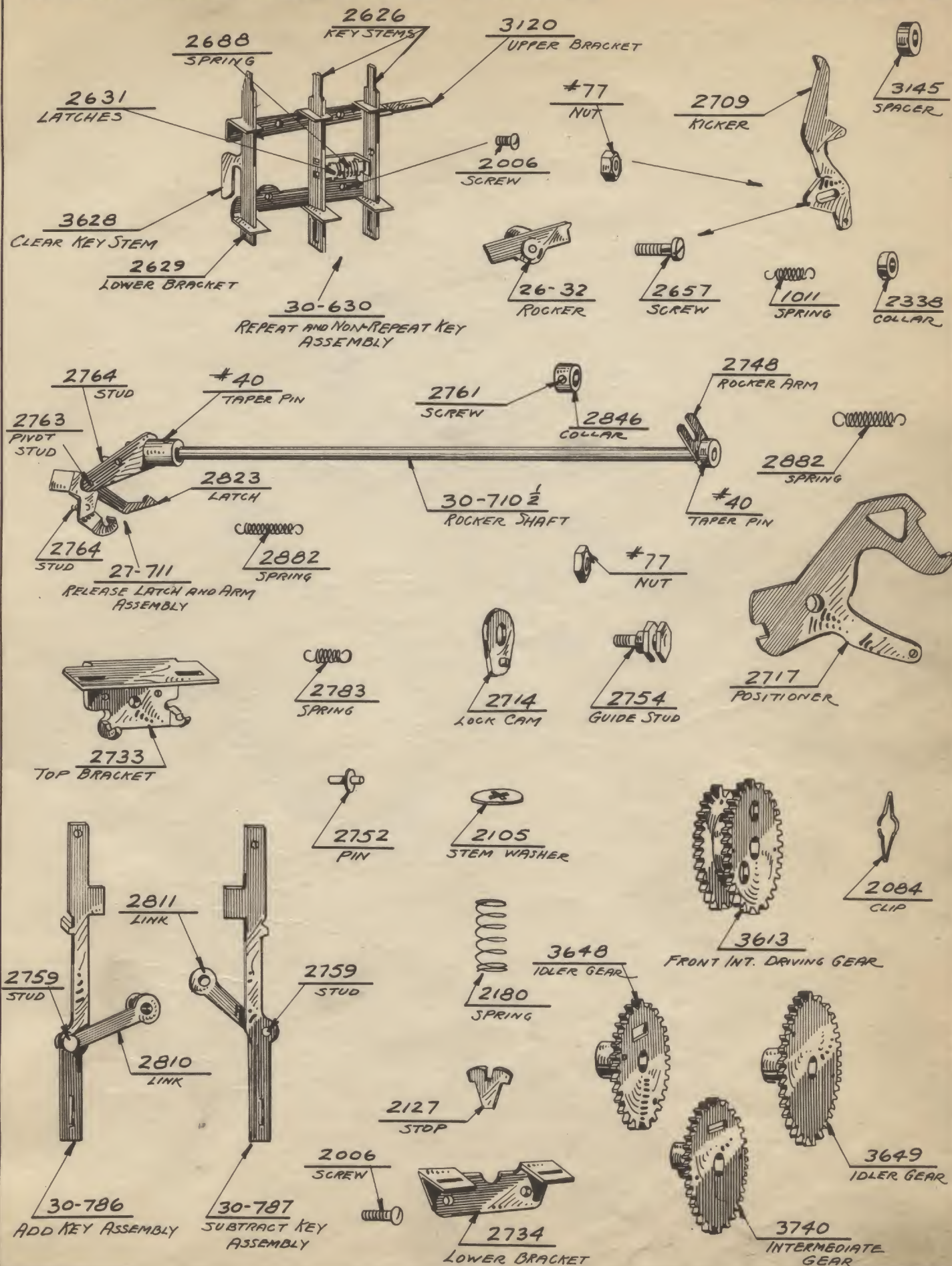
PLATE 72





# RIGHT HAND SIDE FRAME - PARTS

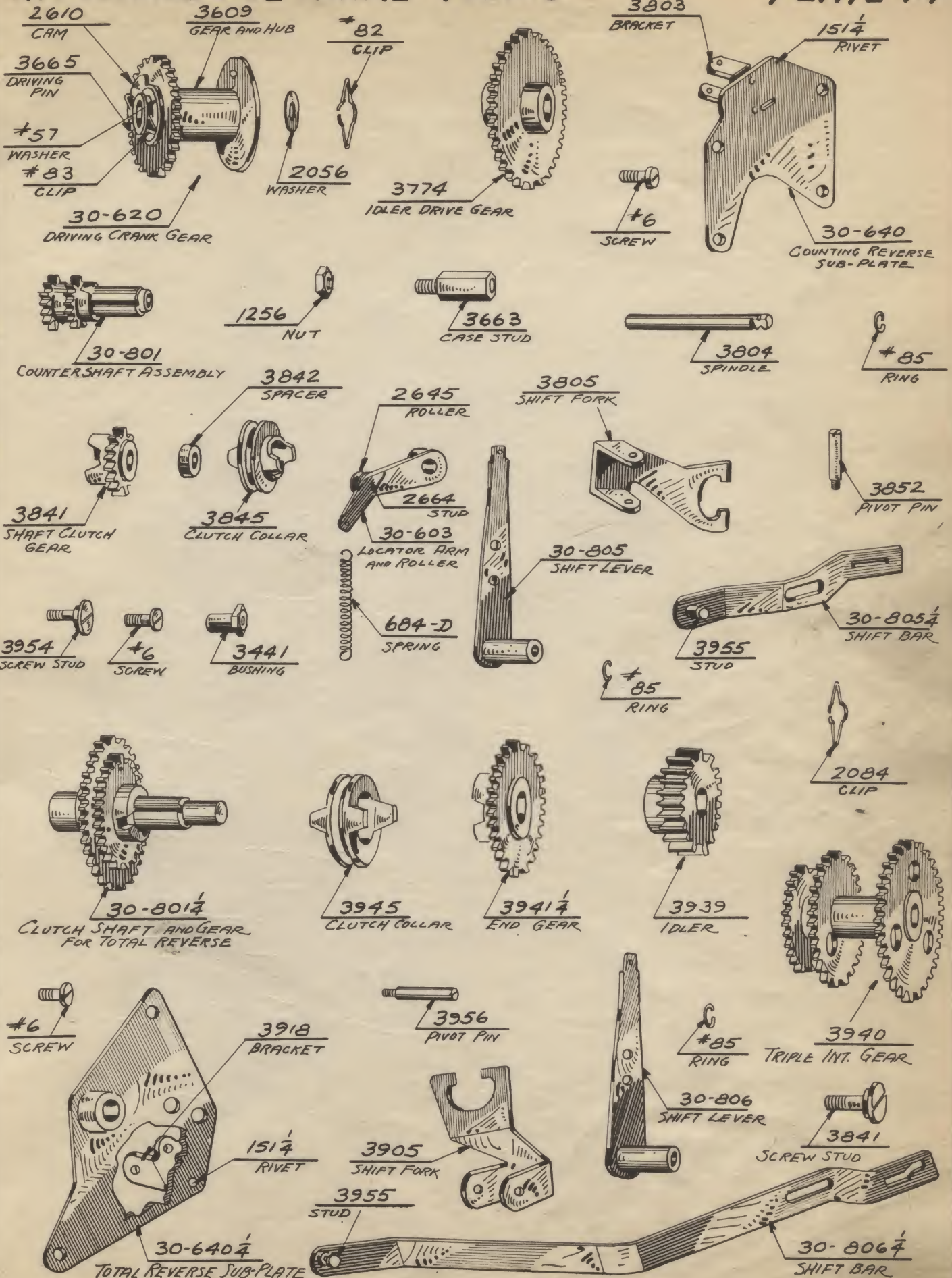
PLATE 73





# RIGHT-HAND SIDE FRAME - PARTS

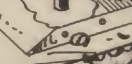
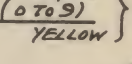
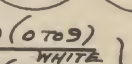
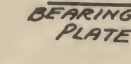
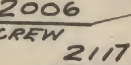
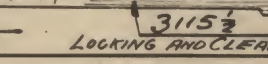
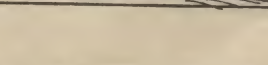
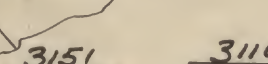
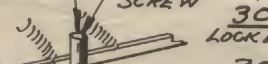
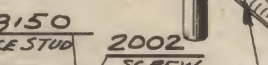
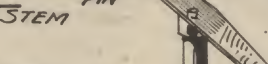
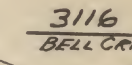
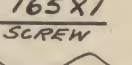
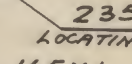
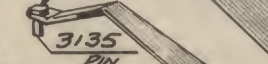
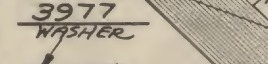
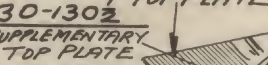
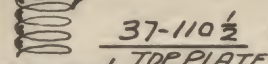
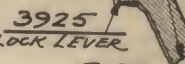
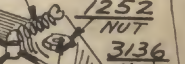
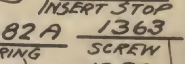
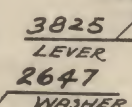
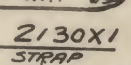
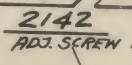
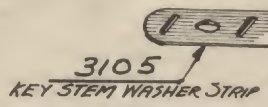
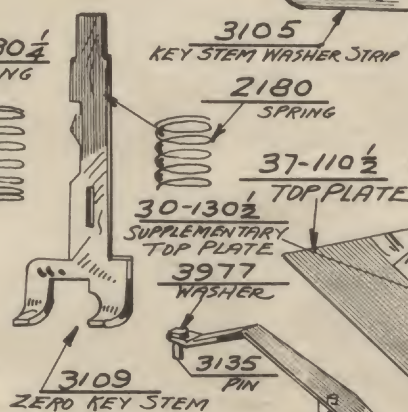
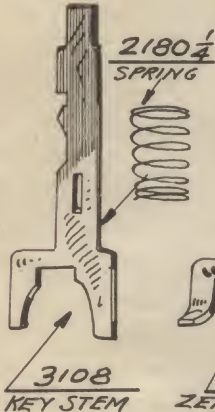
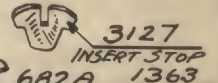
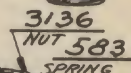
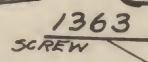
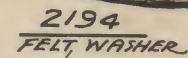
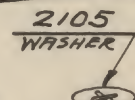
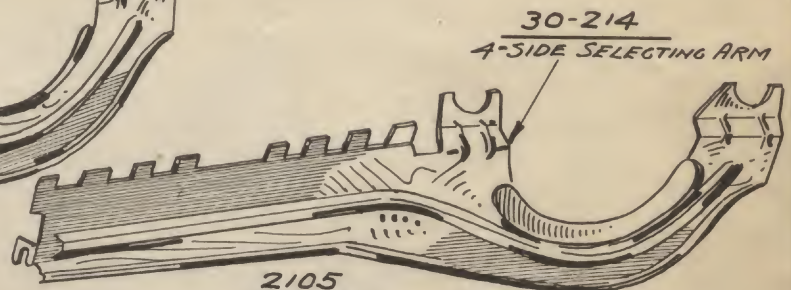
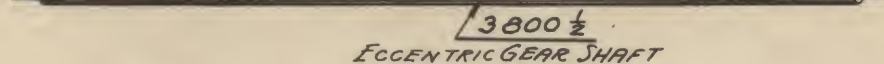
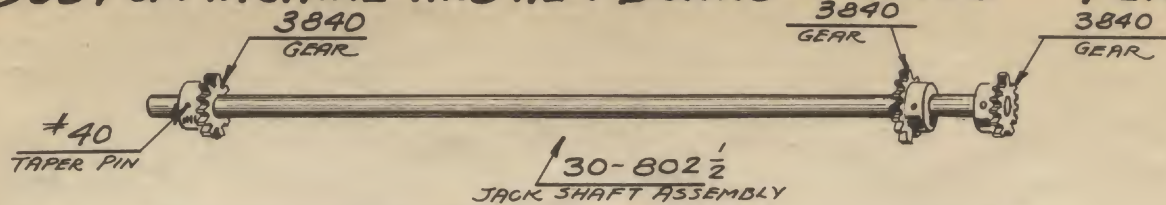
PLATE 74





# BODY OF MACHINE AND KEY BOARD - PARTS

PLATE 75









# LEFT-HAND SIDE FRAME-PARTS

PLATE 77

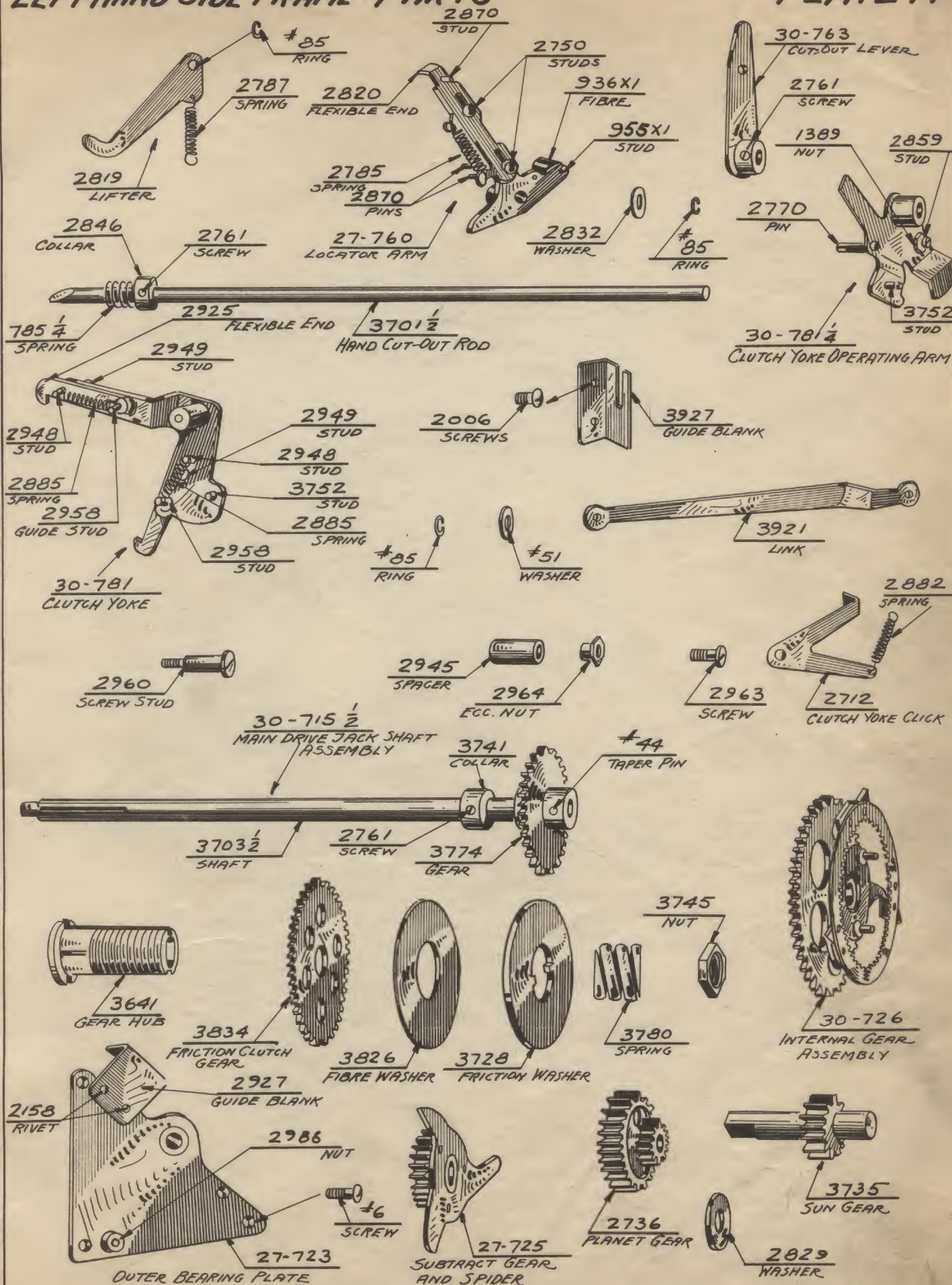
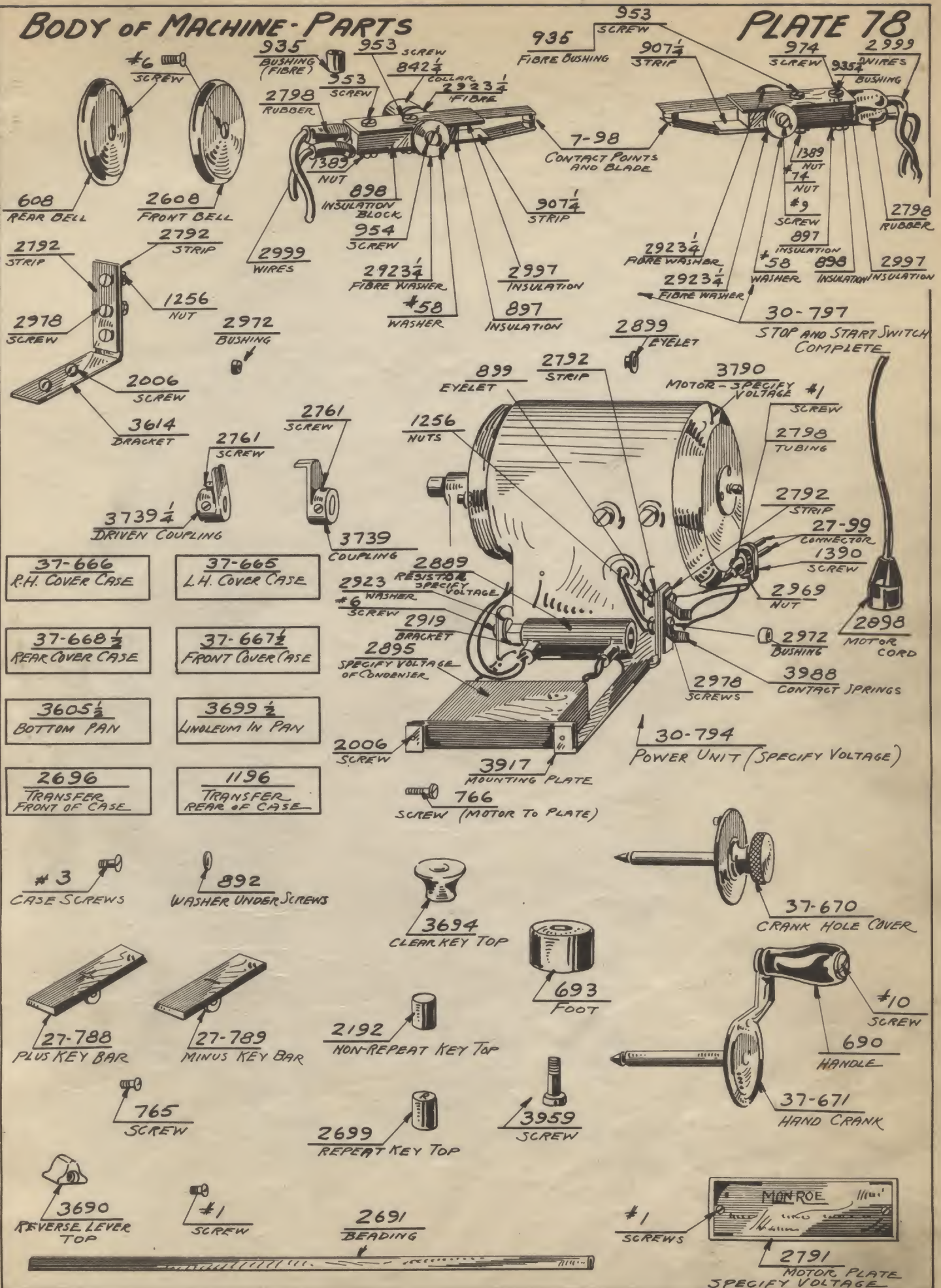




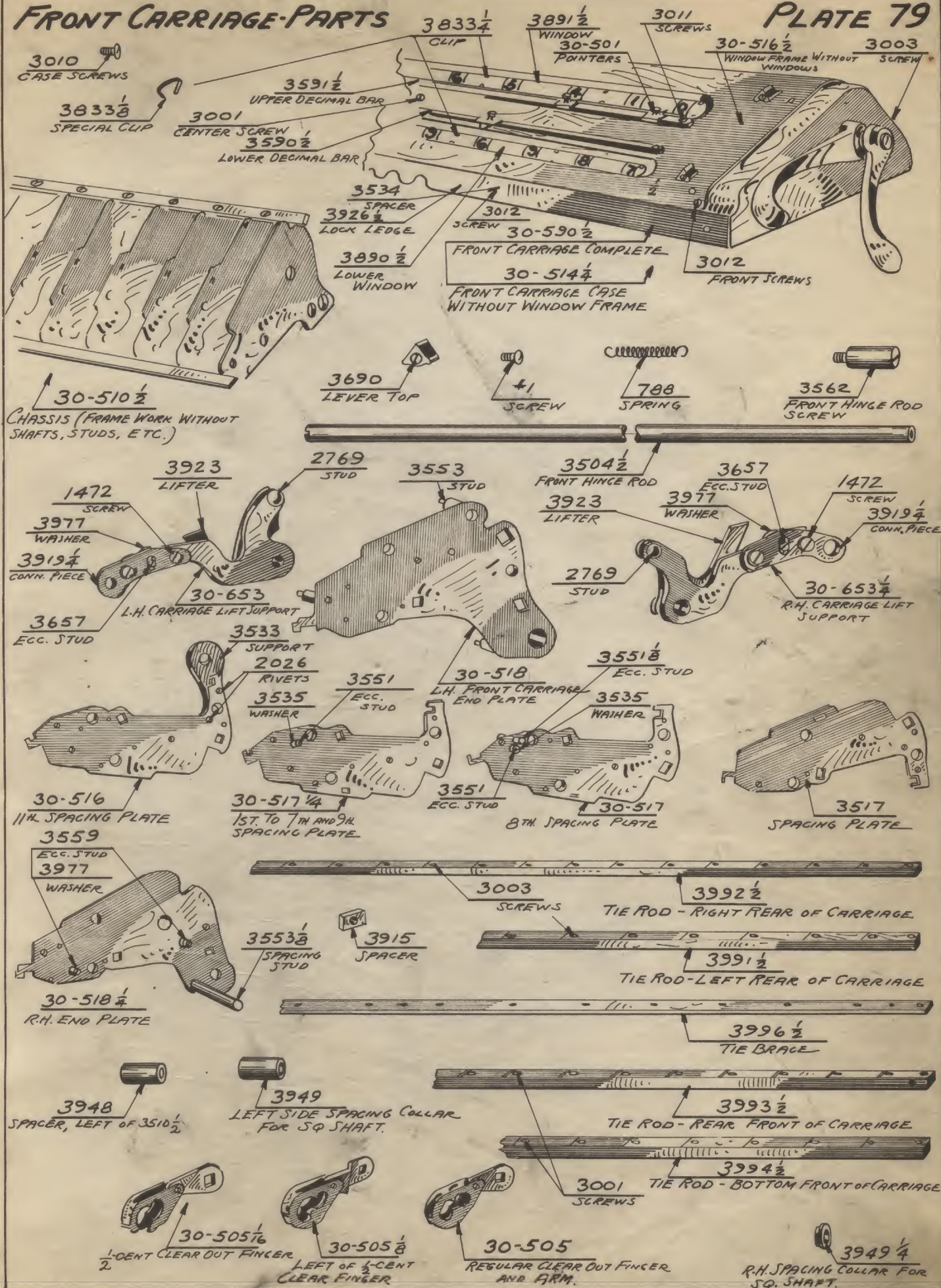
PLATE 78





# FRONT CARRIAGE-PARTS

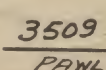
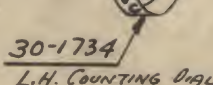
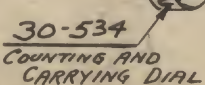
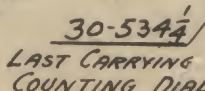
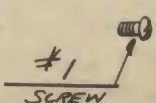
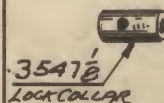
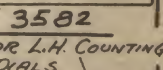
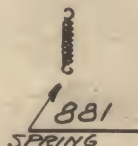
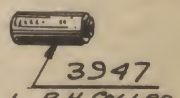
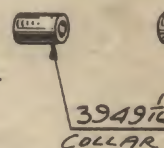
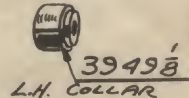
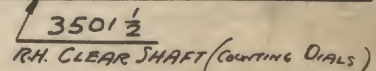
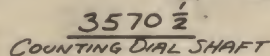
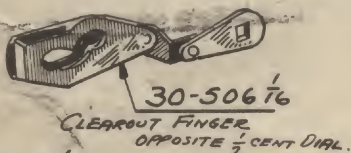
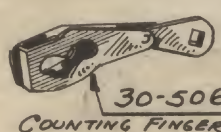
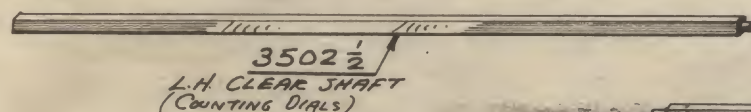
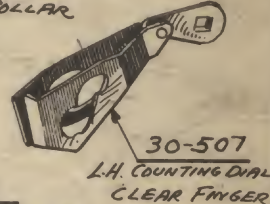
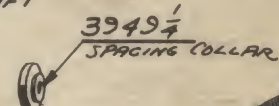
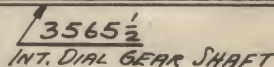
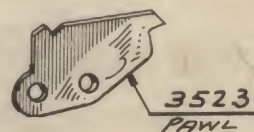
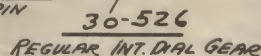
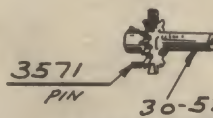
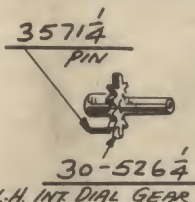
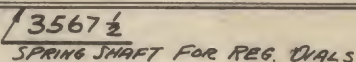
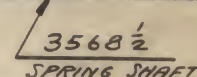
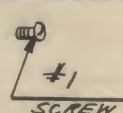
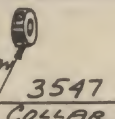
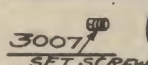
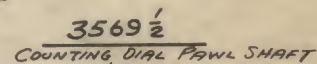
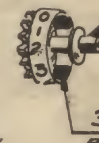
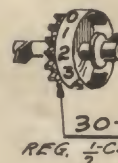
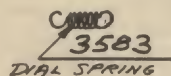
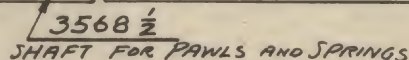
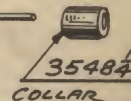
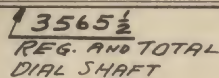
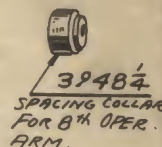
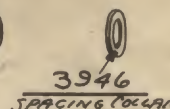
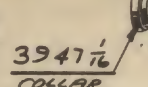
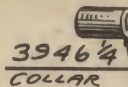
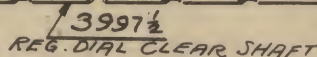
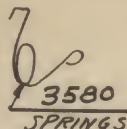
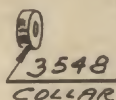
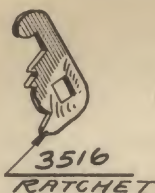
PLATE 79





# FRONT CARRIAGE - PARTS

PLATE 80





# FRONT CARRIAGE - PARTS

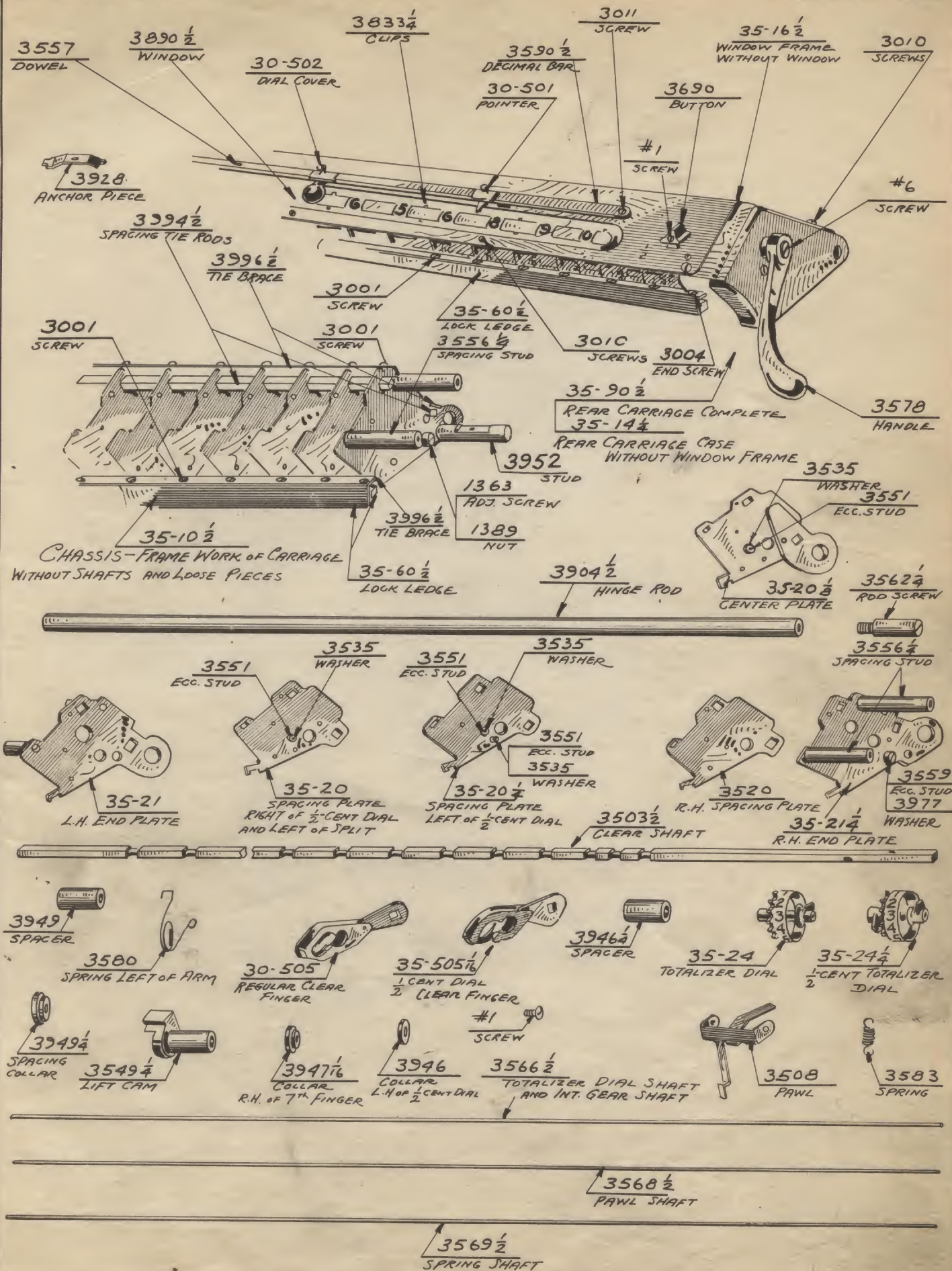
PLATE 81





# REAR CARRIAGE - PARTS

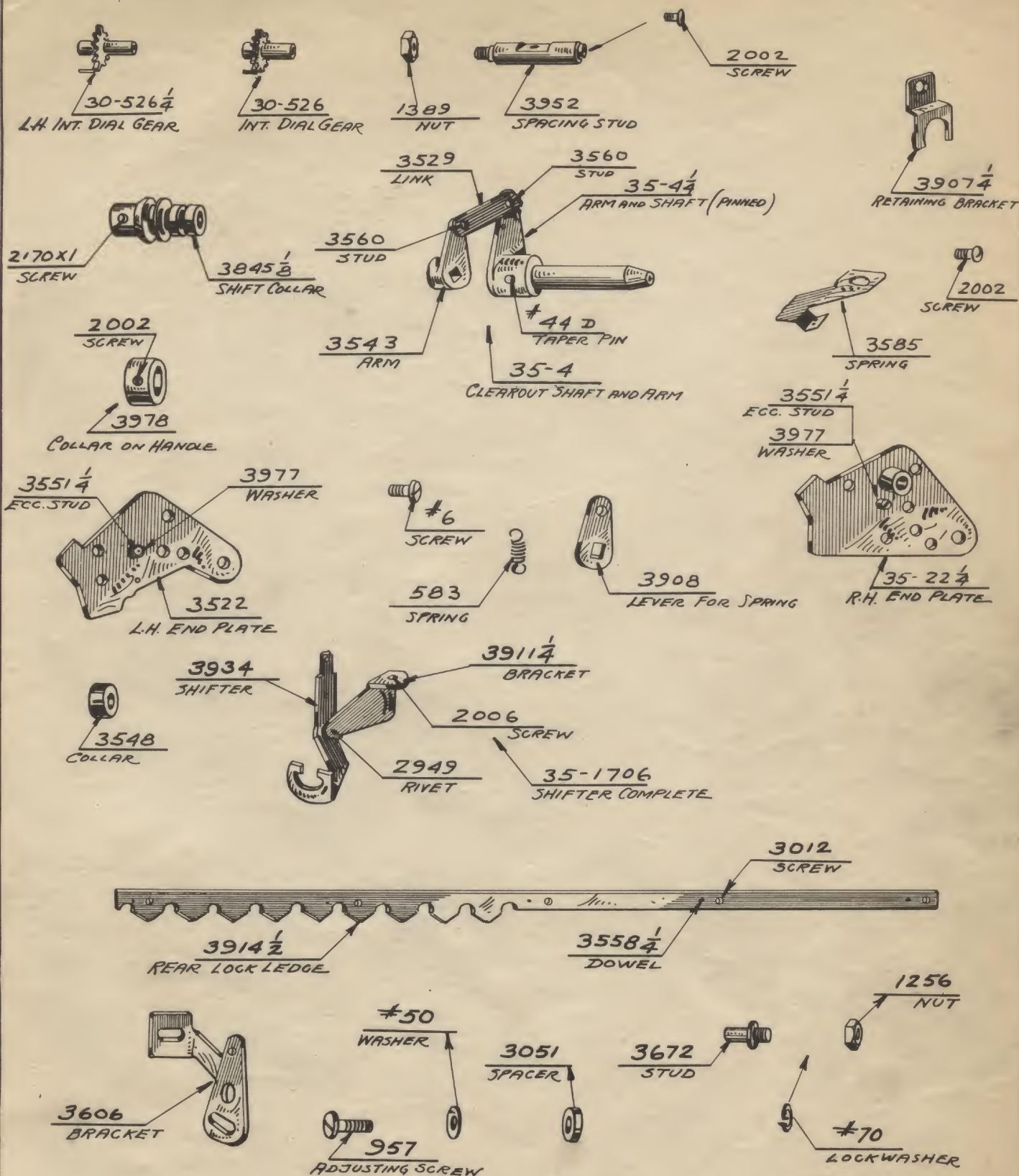
PLATE 82





# REAR CARRIAGE - PARTS

PLATE 83





"K" PARTS AND ASSEMBLIES USED IN "MA" MODEL

Part Number	Description	Shown On Plates Number	Price
1	#2-64x1/8 Round Head Machine Screw	78,82,79,80	.05
3	6-40x1/4 Flat Head Screw - black	78	.05
6	6-40x1/4 Filister Head screw - nickeled	68,71,74,77,81, 82,83,78	.05
9	8-36x5/8 Filister Head Machine Screw	78	.05
10	8-36x11/32 Filister Head Machine Screw	78	.05
40	.070x13/32 Taper Pin	68,69,73,75	.05
41	.070x15/32 Taper Pin	69,71,72	.05
44-D	Taper Pin for Cam L.H.Registering Dial Shaft	81,83	.05
44	3/32x1/2 Taper Pin	77	.05
45	3/32x19/32 Taper Pin	69,72	.05
51	.031x.195x3/8 Washer	77	.03
57	.031x7/16x5/8 Washer	74	.05
58	.031x17/16x1/2 Washer	78	.03
67	1/16x13/2 Lock Washer	70	.05
70	3/64x1/32 Lock Washer	68,71,70	.05
74	8-36x5/16 Hexagon Nut	78	.05
77	6-40 Hexagon Nut	69,70,73,68	.05
82	Wire Retaining Ring for 5/16 stud	74	.03
83	Wire Retaining Ring for 7/16 stud	74	.03
85	Wire Retaining Ring for 5/32 stud	74,76,77	.03
151 1/4	.092x.156 Rivet	74	.03
162	Spring stud for 583 and 682A Springs	75	.08
181x1	Spring for Rear Lock Latches and Front Carriage Lock Levers	70,72	.08
193	Shifter Rod Handle Tip	76	.25
583	Spring for 3825 and 3908	75,83	.05
587	Spring for 35-2	81	.05
608	Bell	78	.25
682A	Spring for 3925	75	.10
684-D	Spring for 30-603	71,74	.10
690	Rubber Handle for 37-671	78	.20
693	Rubber Feet	78	.25
765	Screw for 27-788 and 27-789	78	.03
766	Screw for holding motor to plate 3917	78	.05
774	Motor Screw	68	.15
781 1/4	Spring for 2607, 3607, 3607 1/4	70	.05
785 1/4	Spring for 3701 1/2	77	.05
788	Spring for 30-515 1/2, and 35-60 1/2	79	.05
798	1/16x3/32 Lock Washer	68	.03
842 1/4	Spacing Collar	78	.05
880	Spring for 2723 and 26-1	67,76	.05
881	Spring for 3523	80	.05
892	Fibre Washer for 2006 screw	78	.03
897	Insulation for bottom of start and stop switch	78	.10
898	Insulating Spacer	78	.50
899	Eyelets for Connector Wires and start and stop switch wires	78	.10
907 1/4	Strip for bottom contact point and blade	78	.05
935	Fibre Bushing	78	.07
935 1/4	Fibre Bushing	78	.10
936x1	Fibre Roller for 27-760 and 30-1249	68,77	.15
953	Screw for 30-797	78	.03



"K" PARTS AND ASSEMBLIES USED IN "MA" MODEL

Part Number	Description	Shown on Plates Number	Price
954	Screw for 30-797	78	.05
955xl	Stud for 936xl	68,77	.05
974	Screw for R.H.Start & Stop Switch	78	.05
1006	Spring for 30-820 $\frac{1}{2}$	68	.05
1007	Spring for 30-1248	68	.05
1009	Spring for 37-777 $\frac{1}{4}$	70	.05
1011	Spring for 2709	73	.05
1196	Transfer - rear	78	.15
1252	4-48x3/32 Nut for 3925	75	.05
1256	6-40xl/16 Nut	67,68,69,71,72	
		74,78	.05
1363	4-48x3/16 Round head screw - nickeled	68,75,82	.05
1389	4-48xl/16 Nut	68,69,77,78,81	
		82,83	.05
1390	4-48x9/32 Screw for 27-99	78	.05
1396	8-36x9/32 Screw for 30-663 $\frac{1}{2}$	68	.05
1472	6-40xl/32 Screw for 30-653, 30-653 $\frac{1}{4}$	79	.05
1473	6-40xl3/64 Screw for 3612 and 3612 $\frac{1}{4}$	67	.05
<u>Assembly</u>			
7-98	Contact Point and Blade	78	1.25



Part Number	Description	Shown on Plates Number	Price
2002	4-48x5/32 Round Head Screw - nickeled	75,76,81,83	.05
2006	6-40x7/32 Round Head Screw - nickeled	68,69,73,75,76 77,78,83,81	.05
2026	.061x.120 Rivet for 3533	79	.03
2028	.058x.100 Rivet for Anchor Strip on Key- board Shutter Springs	75	.03
2056	1/2"x5/16" washer for 3609	74	.05
2084	1/2x1/32 for 5/32 stud Wire Retaining Ring	73,74	.03
2105	Key stem washers - steel	73,75	.03
2117	Bearing Plate for 30-103 $\frac{1}{2}$	75	.10
2127	Insert Stopper Key Stems	73	.02
2130x1	Strap for Carriage Shifter Rod	75	.20
2137	Spacing Collar for Carriage Shifter Rod	76	.05
2140	Carriage Shifter Roller	76	.05
2142	Adjusting Screw for Carriage Shifter Rod	75	.10
2143	Spacing Collar on R.H. Lock Lever Stud	70	.05
2152	Pivot Stud for 3116	75	.10
2155	Bearing Stud for R.H. Carriage Lock Lever	70	.10
2156	Pivot Pin for Key Stem Locking Shutter and Selecting Arm	68,75	.03
2158	Rivet for 2117, 2927, and 3821 $\frac{1}{4}$	68,75,77	.03
2160	Stud for carriage shifter roller	76	.08
2164	Rivet for Carriage Shifter Rod Adjusting screw	75	.05
2165x1	Eccentric Rivet Stud for Carriage Shifter Rod Strap	75	.05
2166	Nut for 30-10 $\frac{1}{2}$ , 30-103 $\frac{1}{2}$ and 30-662	68,75	.05
2167	Nut for 30-102 $\frac{1}{2}$ , 30-103 $\frac{1}{2}$ , 30-664 $\frac{1}{2}$ & 30-790 $\frac{1}{2}$	68,75	.05
2170x1	Screw for Shift Handle Hub	76,81,83	.05
2180	Key stem Spring for 3109, add key and subtract Key	73,75	.05
2180 $\frac{1}{4}$	Key Stem Spring	75	.05
2192	Non-repeat Key Button	78	.08
2194	Felt Key Washer	75	.03
2239x1	Selecting Gear Shaft Driving Pinion, Drilled and Pinned	71	.45
2243	Nut for R.H. Bearing on 30-209 $\frac{1}{2}$	71	.10
2251	Driving Pin for Carriage Locking Cam	71	.03
2280	Selecting Gear Spring	71	.08
2290	Brake for Carriage Lock Cam Hubs	70,72	.10
2305	Intermediate Gear	69,70	.10
2306	Carrying Wedge	69,70	.12
2309	Bell Hammer	70,76	.05
2311	Support for L.H. End of Intermediate Shaft	70	.20
2315	Intermediate Gear Bearing	69,70	.10
2334	L.H. Locating Washer on 33-100 $\frac{1}{2}$ and 30-300 $\frac{1}{2}$	69,70	.05
2338	Spacer for 2709	73	.05
2351	Locating Pin for Strap for Carriage Shifter Rod	75	.05
2391	Tie Piece Between 3301 $\frac{1}{2}$ and 30-301 $\frac{1}{2}$ shaft	69,70	.10
2418	Locating Cam	69,72	.15
2442	Pivot Stud on 37-600	67	.10
2447x1	Body for Adjustable Bearing	71	.35
2450	Carrying Wedge Restoring Pin	69,72	.03
2451	Rivet Stud Binding Machine Locating Cam and Carrying Shaft Gear	69,72	.05



"L" AND "LA" PARTS AND ASSEMBLIES USED IN THE "MA" MODEL

Part Number	Description	Shown on Plates Number	Price
2453	Spring Stud	75	.03
2480xl	Carrying Dog Spring	69,72	.05
2483	Spring Washer for Adjustable Bearing	71	.03
2567	Taper Pin for 35-5 $\frac{1}{2}$	81	.05
2574	Taper Pin for L.H. Intermediate Gear Collars	69,70	.05
2607	Rear Outside Over-carry Gear Check Pawl	70	.15
2608	Front Bell	78	.15
2610	Keyboard Clearing Cam	74	.10
2624	Retaining Blank for R.H. End for 33-100 $\frac{1}{2}$	70	.10
2626	Repeat and Non-repeat Key Stem	73	.10
2629	Lower Bracket for repeat, non-repeat and Clear Key Stems	73	.15
2631	Latch for Non-Repeat and Repeat Key Levers	73	.10
2635xl	R.H. Bearing for Selecting Gear Shafts	71	.10
2642	Nut for Selecting Gear Shaft Bearing	71	.05
2645	Machine Locating Cam Roller	71,74	.05
2647	Friction Washer for Strap for Carriage Shifter Rod	75	.05
2647 $\frac{1}{4}$	Friction Washer for Carriage Lock Levers	70,72	.05
2652	Pivot Stud for Crank Handle Latch	67	.05
2653	Spring Stud for Driving Crank Latch	67	.05
2654	Stop Stud for Driving Crank Latch	67	.05
2655	Bearing Stud for L.H. Carriage Lock Lever	70	.05
2656	Pivot Pin for Keyboard Clearing Lever Hub	67	.05
2657	Pivot Stud for Repeat and Non-Repeat Lever for 2709	73	.05
2658	Nut for Keyboard Top Plate Inside Frame	67	.05
2664	Bearing Stud for Machine Locating Cam Roller	71,74	.05
2666	Spring Stud for Locator Cam Spring R.H. Frame	67	.05
2670	Bell Hammer Rod Stud	70,76	.05
2671	Screw for 3601 $\frac{1}{2}$ , 3602 $\frac{1}{2}$ and 3919	68,71,72	.05
2673	Screw for R.H. & L.H. Bracket for 30-300 $\frac{1}{2}$ and 33-100 $\frac{1}{2}$	70	.05
2674	Adjustable Pivot Stud for Carriage Lock	70,72	.05
2688	Spring on Repeat & Non-repeat Latch Plungers	73	.05
2691	Rubber Beading	78	Per ft. .05
2696	Transfer - front	78	.10
2699	Repeat Key Button	78	.10
2709	Non-repeat keyboard Release Lever	73	.15
2712	Yoke Click	77	.15
2714	Lock Cam for Add and Subtract Key	73	.15
2717	Clutch Yoke Positioner	73	.15
2723	Quick Stroke Sub-latch	76	.03
2725	Cycle Stop Latch	76	.20
2726	Latch for Machine Locator Arm	76	.10
2733	Bracket for Add and Subtract Key Stems	73	.15
2734	Lower Bracket for Plus and Minus Key Stem	73	.15
2736	Planet Gear	77	.35
2742	Roller for Machine Stop Lever	76	.05
2747	Guide Bushing in L.H. Side Frame	67	.05
2748	Add and Subtract Rocker Arm, Drilled and Pinned	73	.25



"L" and "LA" PARTS AND ASSEMBLIES USED IN "MA" MODEL

Part Number	Description	Shown on Plates Number	Price
2749	Spacing Collar for add an subtract Lock Pawl	67	.05
2750	Guide Stud for End of Locator Arm	77	.05
2752	Stop Link for Add and Subtract Links	73	.05
2753	Guide Stud for Key Locking Pawl	67	.05
2754	Guide Nut for Key Stems	73	.10
2756	Pivot Stud for Quick Stroke Latch	67	.05
2757	Pivot Stud for Quick Stroke Sub Latch	76	.03
2759	Pivot Stud for Add and Subtract Link	73	.03
2760	Pivot Stud for Add and Subtract Pawl	67	.05
2761	6-40x9/64 Set Screw	68,69,73 76,77,78	.05
2763	Pivot Stud for over-carry Latch	73	.05
2764	Spring Pin in Over-Carry Latch	73	.05
2766	Rivet for Add and Subtract Blank	67	.05
2767	Pivot Stud for Stopping Lever	76	.10
2768	Rocker Stud for Stopping Lever	76	.05
2769	Pivot Stud for Cycle Stop Latch, 30-653, 30-653 $\frac{1}{4}$	76,79	.05
2770	Guide Stud for Hand Cut-out Lever & 30-781 $\frac{1}{4}$	67,77	.05
2771	Rivet for Bumper Pad	67	.03
2772	Stop Stud for Cycle Stop Latch	76	.05
2775	Rivet for Bumper Pad Bracket	67	.03
2782	Spring for Over-Carry Lifter	76	.05
2783	Spring for Add and Subtract Pawl and 37-777	73,76	.05
2784	Spring for Quick Stroke and Arm, and for Front Carriage Lock Latch	70,76	.05
2785	Spring for End of Locator Arm	77	.15
2786	Spring for Over-Carry Trip Lever	76	.05
2787	Spring for Lifter of Locator Arm	77	.05
2790	Bumper Pad	67	.10
2791	Motor Plates-Specify voltage	78	.25
2792	Insulation Strip for Motor Connection and 3614	78	.10
2798	Rubber Tubing	78	.03
2810	Add Key Toggle Link	73	.03
2811	Subtract Key Toggle Link	73	.03
2812	Add Key Lock Pawl	67	.05
2813	Subtract Key Lock Pawl	67	.05
2819	Lifter for Locator Arm	77	.10
2820	Flexible End of Machine Locator Arm	77	.10
2822	Lifter for Over-carry trip Lever	76	.05
2823	Over-carry Release Latch	73	.10
2829	Spacing Washer on Sun Gear	77	.05
2830	Bearing for Clutch Yoke Positioner	67	.05
2831	Spacing Washer between Arm and Lever	76	.03
2832	Washer on Pivot Stud for Stop Lever & 27-760	76,77	.03
2833	Crank Arm Pivot Stud Washer	76	.03
2834	Add & Subtract Lock Blank	67	.05
2846	Locking Collar on Cut-out Shaft & 30-710 $\frac{1}{2}$	73,77	.10
2847	Locking Collar for Lever Shaft and 3102 $\frac{1}{2}$	68,76	.10
2849	Guide Stud for Transmission Yoke	67	.10
2854	Stop Stud for Cycle Arm	67	.05
2855	Spring Stud for Cycle Stopping Arm	67	.05
2858	Spring Stud for Cycle Stopping Latch	76	.05
2859	Stud for Clutch Yoke	77	.10



"L" AND "LA" PARTS AND ASSEMBLIES USED IN "MA" MODEL

Part Number	Description	Shown On Plates Number	Price
2860	Stud for End of Rock Lever	76	.05
2861	Crank Arm Pivot Stud	69	1.05
2862	Stop Stud for Lever Latch	76	.05
2863	Spring Stud for Quick Stroke	76	.05
2866	Spring Stud for Trip Lever	67	.05
2867	Pivot Stud for Locator Arm	76	.05
2868	Stud for Trip Lever Lifter	76	.05
2870	Lifter Stud for Locator	77	.05
2875	Spacer Bearing for Inner Plate	69	.05
2876	Spacer Bearing for Outer Plate	69	.10
2878	Screw for Inner Bearing Plate	69	.05
2880	Wedge Spring	69,70	.03
2882	Spring for Release Latch, 2712,2717 & 30-813	73,76,77	.05
2884	Spring on Stopping Latch	76	.05
2885	Spring for End of Transmission Yoke	77	.05
2886	Spring for Cycle Stop Arm	76	.05
2889	Resistor - Specify Voltage	78	.75
2895	Condenser - Specify Voltage	78	.75
2898	Motor Cords 8'	78	1.00
2898 $\frac{1}{4}$	Motor Cords 12'	78	1.25
2898-1/8	Motor Cords 16'	78	2.00
2898-3/4	Motor Cords 20'	78	3.00
2899	Eyelet for Wire Ends	78	.02
2919	Holder for Resistor Unit	78	.10
2923	Insulation Washer for a Breaker	78	.05
2923 $\frac{1}{4}$	Fibre Washer	78	.05
2925	End of Clutch Yoke	77	.05
2927	Guide on End of Yoke	77	.10
2945	Spacing Collar on Pivot Stud	77	.05
2946	Guide Stud for Release Arm	76	.05
2947	Spring Stud for Yoke Click	67	.05
2948	Spring Stud for End Yoke	77	.05
2949	Guide Stud for End Yoke, 30-1705 and 35-1706	77,81,83	.05
2958	Spring Stud for Yoke End	77	.05
2960	Screw Stud for Clutch Yoke Hub	77	.05
2963	Pivot Screw for Yoke Click	77	.05
2964	Eccentric Nut for Yoke Click	77	.08
2965	Nut for Screw Stud and Hub	67	.10
2969	Lock Nut for connector	78	.10
2972	Bushing for Contact Screw and 30-794	78	.05
2978	Contact Screw for Motor Connection and 30-794	78	.05
2997	Insulator for top of start and stop switch	78	.10
2999	Wires for Start and Stop Switch	78	.25

ASSEMBLIES

26-1	Driving Crank Latch and Stud	67	.10
26-27	Cup for Adjustable Bearing and Pilot Pin	71	.15
26-32	Non-repeat and repeat key levers	73	.15
27-99	Connector for Start and Stop Cable	78	.15
27-711	Release Latch and Arm Drilled and Pinned	73	.50
27-712	Assembly for Release Latch operating Arm	76	.15



"L" and "LA" PARTS AND ASSEMBLIES USED IN "MA" MODEL

Part Number	Description	Shown on Plates Number	Price
27-716	Bumper Pad Complete	67	.30
27-722	Inner Side Transmission Bearing Plate	69	.45
27-723	Outer side Transmission Bearing Plate	77	.55
27-725	Subtraction Gear and Spider Assembly	77	.85
27-760	Assembly of Machine Locator Arm	77	.60
27-772	Assembly of Cycle Stopping Latch	76	.80
27-774	Assembly of Machine Stopping Lever	76	.65
27-776xl	Over-carry Trip Lever Guide	76	.15
27-778	Bracket and Stop Stud for Trip Lifter	76	.15
27-780	Assembly for Quick Stroke Latch and Hub	78	.20
27-788	Plus Key Top and Bracket	78	.55
27-789	Minus Key Top and Bracket	78	.55



## MA PARTS AND ASSEMBLY LIST

Part Number	Price Each	Description	Shown on Plate Number
3001	\$.05	Screws for tie rods	79,82
*3001 $\frac{1}{4}$	.05	Special screw for tie rod	
3002	.05	Holding screws for supplement keyboard	75
3003	.05	Screws for rear tie rods in front carriage	79
3004	.05	End screws for rear carriage window frame	82
3005	.05	Pivot screw for rear hinge rod bracket	71
3010	.05	Screw to fasten front carriage cover to center anchor piece	79,82
3011	.05	Screw to fasten carriage decimal bar	79,82
3012	.05	Screw to fasten front carriage cover to end plates	79
*3025	.05	Rivet for registering dials	
*3025 $\frac{1}{4}$	.05	Rivet for dummy dials	
*3026	.05	Rivet for counting dials	
*3050	.05	Washer for cover case	
*3051	.05	Inside washer for rear lock bracket	
3077	.10	Nuts for carry shaft bearing	69,72
3102 $\frac{1}{2}$	.10	Operating rod for zero mechanism	68
3105	.10	Keystem washer strip	75
3108	.10	Keystem	75
3109	.10	"O" Keystem	75
3110	.15	Keystem locking shutter	75
3111 $\frac{1}{2}$	.15	Anchor strip for keyboard shutter springs	75
3115 $\frac{1}{2}$	.20	Keyboard clearing and locking bar	75
3116	.15	Bell crank of keyboard locking bar	75
3120	.10	Upper bracket for non-repeat, repeat & clearing keystems	73
*3123	.05	Knob for keyboard decimal bar	
3127	.05	Inserted stop for keystem	75
3135	.05	Pin for keyboard lock lever	75
3136	.05	Nut collar for lock lever	75
*3138	.50	Hub for carriage shifter handle	
*3139	.05	Spacer for keyboard decimal marker	
3144	.05	Brake collar for L.H. front carriage lock cam	70
3145	.05	Spacer for keyboard release kicker	73
3150	.08	Keyboard bracing stud	75
3151	.08	Spacing stud for keyboard	75
3160	.05	Pivot screw stud for decimal bar	75
*3161	.05	Stud for holding supplement keyboard to top keyboard plate	
*3162	.05	Retaining stud for decimal bar spring	
*3170	.05	Screw for shift handle hub	
3182	.05	Spring for keystem locking shutters	75
3185	.05	Spring for shifter	76
3190	.10	#0 to #9 White key button	75
3191	.10	#0 to #9 Yellow key button	75
3235#1	.50	Four-tooth selector	71
3235#3	.50	Four-tooth selector	71
3235#4	.50	Four-tooth selector	71
3235#5	.50	Four-tooth selector	71
3235#6	.50	Four-tooth selector	71

\*Not illustrated



Part Number	Price Each	Description	Shown on Plate Number
3235#7	\$.50	Four-tooth selector	71
3235#8	.50	Four-tooth selector	71
3236#1	.50	Five-tooth selector	71
3236#2	.50	Five-tooth selector	71
3236#3	.50	Five-tooth selector	71
3236#4	.50	Five-tooth selector	71
3236#5	.50	Five-tooth selector	71
3236#6	.50	Five-tooth selector	71
3236#7	.50	Five-tooth selector	71
3237	.25	Keyboard locking cam	71
3240	.20	Driver for R.H. front carriage lock cam	71
3242	.05	Collar on spacing pin on selecting gear shaft	71
3256	.05	Spacing pin on selecting gear shaft	71
3301 $\frac{1}{2}$	.40	Support shaft for wedge and check spring bearing	69,70
3314	.15	Check spring support arm	69,70
*3314-1/8	.15	Check spring support arm	
3335	.25	L.H. intermediate gear shaft collar	69
3336	.15	Intermediate gear shaft collar	69,70
3341	.05	Guide nut for extra carry check pawl	70
3342	.10	Spacer on support shaft to the right of wedges	69,70
3343	.10	Spacing collar between wedge and spring support	69,70
3345	.10	4th & 8th collar on wedge support shaft	69,70
*3345x1	.10	4th & 8th collar on wedge support shaft	
3348	.25	R.H. intermediate gear shaft collar	69,70
*3349	.15	Guide collar for trip levers	
3350	.15	Aligning pin between intermediate gear shaft and wedge support shaft	69,70
3353	.05	Screw for plate at L.H. end of intermediate gear shaft	70
3354	.05	L.H. swivel for check spring	70
3354 $\frac{1}{4}$	.05	R.H. swivel for check spring	69,70
3355	.05	Spring stud on counting finger	76
*3355 $\frac{1}{4}$	.05	Spring stud for R.H. counting finger	
3374	.10	Screw for left end of intermediate gear shaft	70
*3374x1	.10	Screw for left end of intermediate gear shaft	
3380 $\frac{1}{4}$	.05	Check spring for left-hand intermediate gear	69,70
3380 $\frac{1}{2}$	.25	Intermediate gear check spring	69,70
3415	.20	#1 carry arm	69,72
3416	.10	Addition carry dog	69,72
*3416 $\frac{1}{4}$	.10	L.H. end subtraction dog	
3417	.10	Subtraction carry dog	69,72
*3435	.05	Spacer for locator arm	
3436	.10	Spacing collar between carry arms	69,72
3437	.08	L.H. spacing collar between carry arms	69,72
3438	.08	Carry shaft nut	69,72
*3439	.10	Hub for carry shaft	
3441	.10	Eccentric bushing for locator arm	71,74
3443	.05	Washer on left end of carry shaft	69,72
3446	.10	Adjusting knob for front carry shaft	69
3447	.35	L.H. bearing for rear carry shaft	72
*3458	.05	Screw stud for carry shaft adjusting blank	

\*Not illustrated



Part Number	Price Each	Description	Shown on Plate Number
3483	\$.05	Friction washer for L.H. rear carry bearing	71
3490	.05	Ball for thrust bearing	69
*3501 $\frac{1}{4}$	.20	Shift knob for counting dial clear shaft	
3501 $\frac{1}{2}$	.50	10-tooth counting dial clear shaft	80
*3501 $\frac{1}{2}$ x1	.50	10-tooth counting dial clear shaft	
*3501 $\frac{1}{2}$ -FR	.50	Counting dial clear shaft	
3502 $\frac{1}{2}$	.50	19-tooth counting dial clear shaft	80
*3503x1	.30	Totalizer dial clear shaft (17 place)	
*3503-FR	.30	OBSOLETE	
*3503-1/16	.20	L.H. total clear shaft	
*3503-1/16) FR )	.20	L.H. clearout shaft	
*3503-1/8	.20	L.H. total clear shaft	
3503 $\frac{1}{2}$	.35	Totalizer dial clear shaft	82
*3503 $\frac{1}{2}$ x1	.35	Totalizer dial clear shaft (21 place)	
*3503 $\frac{1}{2}$ -FRx1	.75	Centime secondary dial clear shaft	
3504 $\frac{1}{2}$	.75	Front hinge rod	79
3508	.15	Pawl for registering dials	80, 82
*3508-FR	.15	Pawl for secondary dial for centime dial	
3509	.15	Pawl for counting dial gear	80
3515	.10	Anchor piece for carriage cover	81
3516	.10	Ratchet for clearout full stroke mechanism	80
3517	.10	Spacing plate for front carriage	79
3520	.10	Intermediate plate for rear carriage	82
3523	.10	Pawl for clearout full stroke mechanism	80
*3523x1	.10	Pawl for clearout full stroke mechanism	
3524	.10	Latch for clearout full stroke mechanism	80
*3524x1	.10	Latch for clearout full stroke mechanism	
3526	.05	Connecting link for counting dial	81
*3526x1	.05	Connecting link for counting dial clearout arms	
3527	.05	Connecting link for clearout operating arms of 10-tooth counting dials	81
3528	.05	Connecting link for clearout operating arms of registering dials	81
3529	.05	Connecting link for totalizer dial clearout operating arm	83
3530	.05	Connecting link on left side of front carriage	81
3531	.10	Operating arm for 10-tooth connecting dial clearout	81
*3531x1	.10	Operating arm for 10-tooth connecting dial clearout	
3533	.10	Hinge rod support on center carriage spacing plate	79
*3533x1	.10	Hinge rod support on center carriage spacing plate	
*3533 $\frac{1}{4}$	.10	Hinge rod support for rear carriage	
3534	.15	Shifter for clutch in carriage	81
3534-1/8	.10	Bracket to hold shifter for lower dial clear shaft	81
3534 $\frac{1}{4}$	.20	Shifter for lower dial clear shaft	81
3535	.05	Friction washer for eccentric on front carriage spacing plates	79, 82
3536	.05	Nut for right & left end plates of front carriage	81
3539	.05	Spacer for front lock ledge	79
*3539 $\frac{1}{4}$	.05	Spacer for rear lock ledge	
3541	.25	Arm on shaft for registering dial clearing handle	81
3542	.20	Arm on 10-tooth counting dial square shaft	81

\*Not illustrated



Part Number	Price Each	Description	Shown on Plate Number
3543	\$.30	Operating arm on square shaft	81,83
*3543 $\frac{1}{4}$	.05	Stop blank for reg. dial clearout shaft	
3544	.05	Washer for connecting link of registering dial clearout	81
*3544 $\frac{1}{4}$	.05	Washer on special clearout finger for 10-tooth counting dial	
*3545xl	.05	Spacer for counting dial clearout arm	
*3545-1/8	.10	Clutch collar for total shaft	
3545 $\frac{1}{4}$	.15	Shift collar on lower dial clearout	81
3546	.10	Collar on clearout hollow shaft	81
3547	.05	Collar on left of pawl & latch of clearout full stroke mechanism	80
*3547xl	.05	Collar on left of pawl & latch of clearout full stroke mechanism	
3547-1/8	.05	Lock collar	80
3547 $\frac{1}{4}$	.10	Collar on right of pawl & latch of clearout full stroke mechanism	80
*3547 $\frac{1}{4}$ xl	.10	Collar on right of pawl & latch of clearout full stroke mechanism	
3548	.05	Collar on left of ratchet of clearout full stroke mechanism	80,81,83
3548 $\frac{1}{4}$	.05	Collar on right of ratchet of clearout full stroke mechanism	80
3549	.45	Front carriage lift cam	80
3549 $\frac{1}{4}$	.50	Rear carriage lift cam	82
*3549 $\frac{1}{4}$ xl	.50	Rear carriage lift cam	
*3549 $\frac{1}{4}$ -FR	.50	R.H. rear lift cam	
*3550	.05	Rivet to connect clearout finger	
*3550-1/16	.05	Rivet for special counting dial clearout finger	
*3550-1/8	.05	Rivet for special clearout finger	
*3550 $\frac{1}{4}$	.05	Rivet for special counting dial clearout finger	
3551	.05	Eccentric for front carriage spacing plates	79,83
3551-1/8	.05	Eccentric for 3510-1/8	79,82
3551 $\frac{1}{4}$	.05	Eccentric for rear carriage spacing plates	83
3552	.05	Rear carriage lift stud on front carriage	81
3553	.05	Spacing studs on L.H. end plate of carriage	79
*3553-1/16	.10	Stud for R.H. front carriage end plate	
3553-1/8	.05	Spacing studs on R.H. end plate of carriage	79
3553 $\frac{1}{4}$	.15	Spacing stud on R.H. end plate of front carriage (to hold clutch shifter spring)	81
3554	.05	Spring stud for extra-carry check pawl & over- carry check pawl	67
3555	.05	Stud for operating arms of registering dials	81
3556	.05	Spacing stud on L.H. end plate of rear carriage	82
3556 $\frac{1}{4}$	.05	Spacing stud on R.H. end plate of rear carriage	82
3557	.05	Dowel pin-decimal bars on carriage	82
*3558	.05	Spacing stud between front carriage ledge and spacing tie rod	
*3558 $\frac{1}{4}$	.05	Spacing stud between rear carriage ledge and spacing tie rod	
3559	.05	Eccentric stud for carriage clearout adjustment	79,82

\*Not illustrated



Part Number	Price Each	Description	Shown on Plate Number
3559 $\frac{1}{4}$	\$.05	Eccentric stud for arm for carry counting dial clearout	81
3560	.05	Stud for clearout operating arm	81,83
3561	.05	Stud for 10-tooth counting dial	81
3562	.10	Screw to hold front hinge rod	79
3562 $\frac{1}{2}$	.10	Screw to hold rear hinge rod	82
*3564	.05	Riveting stud for 10-tooth counting dial	
3565 $\frac{1}{2}$	.10	Dial shaft	80
3566 $\frac{1}{2}$	.10	Intermediate gear shaft-rear carriage	82
3567 $\frac{1}{2}$	.10	Spring shaft for registering dials	80
3568 $\frac{1}{2}$	.10	Shaft for registering pawls & counting dial pawls	80,82
3569 $\frac{1}{2}$	.10	Shaft for totalizer pawls & counting dial pawls	80,82
3570 $\frac{1}{2}$	.10	Shaft for counting dials	80
3571	.05	Carry pin for intermediate carriage gears	80
3571 $\frac{1}{4}$	.05	Carry pin for last intermediate carriage gear	80
*3575	.15	Spacer on hinge rod	
3576	.75	Rear handle for link clearcut	MSB-126
3576-1/8	.65	L.H. clearcut handle	MSB-126
3578	.75	Registering & totaling clear handle	81,82
3579	.75	Counting dial clear handle	81
3580	.05	Spring for first 6 clearcut arms of registering dial	80,82
*3580 $\frac{1}{4}$	.05	Spring for counting dial clearout arms	
3581	.05	Spring for carrying counting dial check pawl	80
3582	.05	Spring for 19-tooth counting dial check pawl	80
3583	.05	Spring for registering dial check pawl	80,82
3584	.10	Locating spring for counting dial clutch	81
3584 $\frac{1}{4}$	.10	Locating spring for lower dial shift collars	81
3585	.10	Locating spring for total dial shift collars	83
*3586 $\frac{1}{4}$	.05	Retaining spring for dial & gear shafts (Rear carriage)	
3588	.15	R.H. carriage bumper spring	72
3589	.12	L.H. carriage bumper spring	72
*3590	1.25	Decimal bar for reg. & total dials. (17 place).	
3590 $\frac{1}{2}$	1.25	Decimal bar for registering and total dials (21 place)	79,82
*3591	1.25	Counting dial decimal bar (17 place)	
3591 $\frac{1}{2}$	1.25	Counting dial decimal bar (21 place)	79
3601 $\frac{1}{2}$	.25	Tie rods between guide plates on rear carriage locks	68
3602 $\frac{1}{2}$	.25	Tie rods	68
*3605-1/16	.10	Cupped washer for rectangular rubber feet	
*3605-1/8	.05	Rectangular washer for rubber feet	
*3605 $\frac{1}{4}$	.10	Shell for foot	
3605 $\frac{1}{2}$	3.25	Bottom pan	78
3606	.20	Bracket for rear carriage lock stud	83
3607	.15	Pawl for extra-carry gear	70
3607 $\frac{1}{4}$	.15	Pawl for over-carry gear	70
3608	.05	Ball race for crank arm	69
3609	.75	Crank driving gear	74
3612	.15	L.H. guide plate for carriage lock lever	67

\*Not illustrated



Part Number	Price Each	Description	Shown on Plate Number
3612 $\frac{1}{4}$	\$.15	R.H. guide plate for carriage lock lever	67
3613	.65	Front intermediate driving gear	73
3614	.20	Bracket for contact screws	78
3614x1	.20	Bracket for contact screws	MSB-127
3615 $\frac{1}{2}$	.15	Retaining strip for selector arms	75
*3618	.15	Front intermediate gear shaft support	
*3618 $\frac{1}{4}$	.10	Rear intermediate gear shaft support	
3620	.20	L.H. front carriage lock	70
3620 $\frac{1}{4}$	.20	R.H. front carriage lock	70
3621	.20	L.H. front carriage lock lever	70
3621 $\frac{1}{4}$	.20	R.H. front carriage lock lever	70
3626	.05	Clip to hold hinge rod oiler	72
3628	.15	Clearing keystem	73
3635	.15	Bearing for carrying shafts	69, 72
3637	.30	Bushing for crank handle stud	67
3638	.10	Upper guide hub for carriage lifter	68
3638 $\frac{1}{4}$	.10	Lower guide hub for carriage lifter	68
3639	.05	Upper guide hub for L.H. carriage lifter	68
3639 $\frac{1}{4}$	.05	Lower guide hub for L.H. carriage lifter	68
*3640	.10	Bushing for pivot rod for zero keys	
3641	.35	Friction clutch gear hub	77
3642	.10	Nut for over-carry trip levers	67
3643	.10	Bearing for extra-carry pawl	70
3645	.05	Collar for carriage lock cam hub brake	72
*3646	.10	Hub for L.H. carriage locking lever	
3647 $\frac{1}{4}$	.05	Friction washer for eccentric stud for rear carriage lock link	67, 72
3648	.40	Idler gear	73
3649	.45	Idler gear driving front intermediate gear	73
3651	.05	Locating pin for front carriage rest	69
3652	.10	Spacing stud for counting reverse sub-plate	69
*3652 $\frac{1}{4}$	.10	Lower stud for count. reverse sub plate	
3653	.10	Guide and dowel stud for intermediate shaft plate	67
3654	.05	Pivot pin for roller on carriage lifter	68
3655	.05	Screw for collar (Brake pivot - rear)	72
3656	.15	Guide stud for carriage lock link (rear)	72
3657	.05	Eccentric stud for carriage adjustment bracket	67, 72, 79
3658	.05	Nut for side frames	67, 79
3658 $\frac{1}{4}$	.05	Nut for channel brace	68
3659	.05	Pin for guide bracket (carriage lock) (rear)	72
3660	.05	Eccentric stud for carriage adjustment bracket	67
3660 $\frac{1}{4}$	.10	Case stud for L.H. side of machine	68
3661	.10	Case stud for R.H. side of machine	68
*3661-1/8	.10	R.H. cover case stud	
3661 $\frac{1}{4}$	.15	Case stud and idler bearing	68
3662	.10	Case stud L.H. side of machine	68
3663	.10	Case stud R.H. side of machine	74
3664	.05	Screw for R.H. lower guide hub for R.H. carriage lifter	68
3664 $\frac{1}{4}$	.05	Screw for R.H. upper guide hub for R.H. carriage lifter	68

\*Not illustrated



Part Number	Price Each	Description	Shown on Plate Number
3665	\$.05	Driving pin for keyboard clearing cam	74
3666	.05	Spring stud for locator arm	67
3667	.05	Dowel stud for L.H. intermediate gear shaft end plate	67
3668	.05	Screw for L.H. lower guide hub for L.H. carriage lifter	68
3672	.05	Lock stud for rear carriage	83
3674	.10	Eccentric stud for carriage lock link	67,70,72
3674 $\frac{1}{4}$	.05	Screw for carriage lock link	72
3676	.10	Bushing for motor screws	68
3680	.05	Spring for R.H. carriage lifter	68
*3681	.10	Locator spring	
3690	.25	Knob for total and counting mechanism shift levers	78,79,82
3691	.10	Rubber foot	Plate 14 of MSB 131
3693	.05	Hinge rod oiler	72
3694	.15	Clear key button	78
*3695	.25	L.H. lining for case	
*3695 $\frac{1}{4}$	.25	R.H. lining for case	
*3696 $\frac{1}{2}$	.15	Front lining for case	
*3697 $\frac{1}{2}$ x1	.20	Rear lining for case	
3699 $\frac{1}{2}$	.40	Linoleum lining for bottom pan	78
3701 $\frac{1}{2}$	.15	Hand cut-out cam shaft	77
3703 $\frac{1}{2}$	.60	Lower jack shaft D & P	77
3704 $\frac{1}{2}$	.25	Motor coupling shaft	MSB 127
3712	.15	Bracket for connector	MSB 127
3721	.15	Connecting link between crank arm & rock lever	76
3728	.10	Friction washer on gear hub	77
3735	.75	Sun pinion	77
*3736	.10	Nut for motor mounting plate	
3739	.35	Motor coupling	78
3739 $\frac{1}{4}$	.35	Driving coupling on sun pinion shaft	78
3740	.45	Intermediate driving gear	73
3741	.10	Collar on lower jack shaft	77
3742	.10	Bushing in motor bracket	68
*3742x1	.10	Bushing in motor bracket	
3745	.10	Friction nut for friction gear hub	77
3749	.10	Guide collar for clutch yoke	67
3752	.05	Stud for connecting link on clutch yoke and operating arm	77
3755	.10	Motor support stud	MSB 127
3774	.50	Idler & lower jack shaft gear (Right side D&P)	74,77
3780	.25	Friction spring (Lower jack shaft)	77
3781	.10	Bell hammer wire for front trip lever	76
3781 $\frac{1}{4}$	.10	Bell hammer wire for rear trip lever	70
3792	.10	Insulator strip for motor connections	MSB 127
3800 $\frac{1}{2}$	.15	Eccentric gear shaft for counting fingers	75
3801 $\frac{1}{2}$	.10	Camming & spring shaft for counting fingers	76
3804	.10	Spindle for counting mechanism	74
3805	.25	Shift fork for counting reverse mechanism	74

\*Not illustrated



Part Number	Price Each	Description	Shown on Plate Number
*3810x1	\$.15	Shift bar for counting reverse mechanism	
3811	.20	Check spring support arm	69
*3811-1/8	.20	6th check spring support arm	
3811 $\frac{1}{4}$	.15	R.H. check spring support arm	69
*3814 $\frac{1}{2}$	.45	Felt lining for front carriage cover	
*3815 $\frac{1}{2}$	.30	Felt lining for rear carriage cover	
3816	.20	Rear of clearout link	MSB 126
3816-1/8	.10	Front of clearout lever	MSB 126
3816 $\frac{1}{4}$	.10	Rear clearout latch	MSB 126
3818	.10	L.H. bearing bracket for counting reverse	68
3821 $\frac{1}{4}$	.10	Support bracket for front cover case	68
*3822 $\frac{1}{2}$ x1	.90	Rear cover case	
3825	.15	Lock lever for counting reverse mechanism	75
3826	.05	Fibre friction washer on gear hub	77
3833-1/8	.05	Center clasp for counting dial window	79
3833 $\frac{1}{4}$	.05	Clasp for holding windows	79, 81
3834	.65	Friction gear on jack shaft	77
3836	.05	Spacing collar for counting fingers	76
*3836-1/8	.05	L.H. spacer for 16 place machine	
*3836 $\frac{1}{4}$ x1	.05	Spacing collar between gear & 1st counting finger	
3836 $\frac{1}{4}$	.05	Spacing collar between gear & 1st counting finger	76
3837	.05	Roller for counting fingers	76
*3837x1	.05	Roller for counting fingers	
3839	.20	Idler gear (counting reverse mechanism)	69
3840	.20	Jack shaft gears (counting mechanism)	75
3841	.30	Countershaft clutch gear	74
3842	.05	Collar on spindle for counting mechanism	74
3843	.25	L.H. bearing plate for eccentric gear	76
3843 $\frac{1}{4}$	.25	R.H. bearing plate for eccentric gear	76
3844	.25	Intermediate gear (counting reverse mechanism)	68
3844 $\frac{1}{4}$	.25	Carry shaft gear to drive counting reverse mechanism	69
3845	.35	Clutch collar (Reverse mechanism)	74
3845-1/8	.15	Shift collar on total dial clearout shaft	83
3846	.10	Hub for jack shaft	67
3847	.10	Lower jack shaft bearing (right side)	67
3848	.10	Lower jack shaft bearing (left side)	67
3849	.05	Roller for carriage lifter	68
3850	.05	Pivot stud for counting total reverse mechanism shift lever	69
3851	.05	Spring stud for rear locks and lifter	67
3852	.05	Pivot pin for counting reverse mechanism shifter	74
3853	.35	Eccentric for counting fingers	76
3855	.05	Rivet for counting finger roller	76
3855 $\frac{1}{4}$	.05	Bearing collar for counting finger roller	76
3856	.05	Screw stud for counting reverse idler gear	69
3860	.10	Bearing stud for counting reverse intermediate gear	68
3862	.35	L.H. gear for counting fingers	76
3863	.35	R.H. gear for counting fingers	76
3864	.05	Spring stud for front carriage lock levers	70
3866	.05	Spring stud for over-carry trip pawl (Flexible end)	67
3871	.10	Stud for front locator arm	68

\*Not illustrated



Part Number	Price Each	Description	Shown on Plate Number
*3871x1	\$.10	Stud for front locator arm	
3877	.10	Screw stud for over-carry trip levers (front)	76
*3877x1	.10	Screw stud for over-carry trip levers (front)	
*3880	.05	Spring for carrying fingers	
*3881	.05	Spring for counting fingers & last carrying finger	
*3886	.05	Spring for cycle stop arm	
3890 $\frac{1}{2}$	.65	Window for registering dials	79,82
3891 $\frac{1}{2}$	.60	Window for counting dials	79
3904 $\frac{1}{2}$	.65	Rear hinge rod	82
3905	.35	Shift fork for total reverse mechanism	74
3907	.10	Bracket to hold operating arm on square shaft	81
3907 $\frac{1}{4}$	.10	Retaining arm for operating arm on square shaft of totalizer	83
3908	.05	Lever for return spring of totalizer clear shaft	83
*3910x1	.25	Shift bar for total reverse mechanism	
3911	.15	Bracket to hold shifter for clutch in carriage	81
3911 $\frac{1}{4}$	.15	Bracket to hold shifter for total dial clear shaft	83
3914 $\frac{1}{2}$ x1	.55	Rear carriage ledge (shown as 3914 $\frac{1}{2}$ )	83
3915	.05	Spacer for rear carriage tie rods	79
*3915 $\frac{1}{4}$	.05	Spacer for rear carriage tie rods	
3917	1.15	Motor mounting plate	78
3917 $\frac{1}{4}$	.15	Regulating screw bracket	MSB 127
3918	.25	Bracket for shift fork (total reverse mechanism) (shown as 3803)	74
3919	.10	Hinge rod bearing for rear carriage	71
*3919-1/16	.10	L.H. rear end of hinge rod connecting piece	
3919 $\frac{1}{4}$	.10	Hinge rod connecting piece for rear carriage	79
3920	.20	L.H. rear carriage lock	72
3920 $\frac{1}{4}$	.20	R.H. rear carriage lock	72
3921	.10	Connecting link	77
*3921x1	.10	Connecting link	
3922	.10	L.H. rear carriage lock link	72
3922 $\frac{1}{4}$	.10	R.H. rear carriage lock link	72
3923	.10	Rear carriage lifter	79
3925	.25	Lock lever for total reverse mechanism	75
3926 $\frac{1}{2}$	.50	Carriage lock ledge	79
3927	.10	Guide for clutch yoke operating arm	77
3928	.10	Anchor piece for rear carriage cover	82
3934	.25	Shifter for total dial clear shaft	83
3936	.10	Hub for clutch shafts (total reverse mechanism) (in R.H. side frame)	67
3939	.20	Idler gear (total reverse mechanism)	74
3940	1.15	Intermediate driving gears for total mechanism	74
*3940x1	1.15	Intermediate driving gears for total mechanism	
3941 $\frac{1}{4}$	.55	Clutch shaft gear (total reverse mechanism)	74
3942	.15	Driver for L.H. carriage lock cam (rear)	71
3942 $\frac{1}{4}$	.15	Driver for R.H. carriage lock cam (rear)	71
3944	.05	Bell mounting stud for rear carriage	67
3944 $\frac{1}{4}$	.05	Bell mounting stud for front carriage	67
3945	.35	Clutch collar	74
3946	.05	Collar on left of half-cent dial	80,82

\*Not illustrated



Part Number	Price Each	Description	Shown on Plate Number
3946-1/8	\$.05	Spacer left of lift cam	MSB 126
3946 $\frac{1}{4}$	.05	Collar between clearout fingers of half-cent dial	80,82
3947	.05	Spacing collar on 10-tooth counting dial clear shaft	80,81
3947-1/16	.05	Collar on right of 7th clearout finger	80,82
3947 $\frac{1}{4}$	.05	Spacer on square shaft for 10-tooth counting dial clearout	81
3948	.05	Spacing collar left of 3510-1/8	79
*3948-1/16	.05	L.H. end spacing collar	
3948 $\frac{1}{4}$	.05	Spacing collar right of 3510-1/8	80
3949	.05	Left side spacing collar for square shaft	79,80,82
3949-1/16	.05	Collar on right of special clearout finger arm for 10-tooth counting dial	80
3949-1/8	.05	Collar on left side of special clearout finger arm for 10-tooth counting dial	80
3949 $\frac{1}{4}$	.05	Right side spacing collar for square shaft	79,80,82
3950	.15	Spacing stud for total reverse mechanism sub-plate	69
3950 $\frac{1}{4}$	.10	Special spacing stud for sub-plate (total reverse mechanism)	69
3951	.10	Stud for locator arm rear	69
3952	.15	Spacing stud on R.H. end plate of rear carriage (to hold shift collar locating spring)	82,83
3953	.05	Dowel and spring stud rear intermediate shaft plate	67
3954	.05	Screw stud for total reverse shift bar	74
3955	.05	Spring stud on reverse shift lever	74
3956	.05	Pivot pin for total reverse shifter	74
*3957	.05	Lock nut stud for clearout latch	
3957 $\frac{1}{4}$	.10	Nut for rear clearout latch	MSB 126
3958	.05	Operating stud for rear clearout	MSB 126
3958 $\frac{1}{4}$	.10	Guide spacer for clearout link	MSB 126
3959	.05	Screw for rubber foot	78
*3960	.05	Pivot stud for clearout link	
3976	.10	Nut to hold handle to hollow clear shaft	81
3977	.05	Friction washer for eccentric stud 67,72,75,79,81,82,83	
3978	.10	Collar on handle shaft of rear carriage	83
*3980	.05	Spring for full stroke pawl	
3988	.05	Contact springs for motor connections to machine	78
*3990 $\frac{1}{2}$	.75	Carriage spacing tie rod on carriage ledge	
3991 $\frac{1}{2}$	.35	Carriage spacing tie rod for rear of front carriage (Left side)	79
3992 $\frac{1}{2}$	.35	Carriage spacing tie rod for rear of front carriage (Right side)	79
3993 $\frac{1}{2}$	.75	Carriage spacing tie rod for front carriage (Rear)	79
3994 $\frac{1}{2}$	.75	Carriage spacing tie rod	79,82
*3995 $\frac{1}{2}$	.75	Tie brace	
3996 $\frac{1}{2}$	.75	Carriage tie brace	79,82
*3997	1.65	Reg. dial clear shaft (17 place)	
3997 $\frac{1}{2}$	1.85	Registering dial clear shaft (21 place)	80
*3998 $\frac{1}{2}$ xl	.75	Tie rod for front lock ledge	
*3999 $\frac{1}{2}$	.75	Bottom tie rod for front carriage	

\*Not illustrated



## ASSEMBLIES

Part Number	Price Each	Description	Shown on Plate Number
30-102 $\frac{1}{2}$	\$2.00	Assembly of rear cross plate for keyboard	75
30-103 $\frac{1}{2}$	2.25	Assembly of front cross plate for keyboard	75
30-104	.25	Keyboard lock lever assembly	75
30-120 $\frac{1}{2}$	1.75	Assembly of lower keyboard plate	75
*30-130	4.25	Supplementary keyboard plate (17 place)	
30-130 $\frac{1}{2}$	4.75	Assembly of supplement keyboard (21 place)	75
30-131	.25	Decimal marker & knob	75
30-181	.95	Assembly of shifter rod	76
30-182	.25	Shifter yoke and rolls	76
*30-183	.75	Shifter handle	76
*30-200	11.55	Front selecting shaft (17 place)	
30-200 $\frac{1}{2}$	13.75	Assembly of selecting gear shaft (front) (21 place)	71
30-201 $\frac{1}{2}$	2.25	Selecting shaft & driving gear	71
30-210	.30	Assembly of carriage lock cam	71
30-214	.90	Assembly of four-tooth gear selecting bail	75
30-215	.85	Assembly of five-tooth gear selecting bail	75
30-300 $\frac{1}{2}$	14.50	Front intermediate shaft	69
*30-300 $\frac{1}{2}$ x2	14.50	Front intermediate shaft	
30-301 $\frac{1}{2}$	.75	Intermediate shaft with L.H. collar & washer	69, 70
30-342	.60	Assembly of extra-carry gear (inside)	70
*30-342 $\frac{1}{4}$	.60	Assembly of extra-carry gear (outside)	
30-400 $\frac{1}{2}$	14.75	Assembly of carry shaft gears	69
30-401 $\frac{1}{2}$	2.75	Front carry shaft with gear & crank arm (drilled and pinned)	69
30-403xl	.15	Assembly of 1st counting finger	76
30-403 $\frac{1}{4}$ xl	.20	Assembly of 19-tooth counting finger	76
30-410#2-11	.25	Assembly of carry arms #2 to 11	69, 72
30-420	1.35	Assembly of carry shaft gears	69
*30-500	82.50	Front carriage complete (17 place)	
*30-500 $\frac{1}{2}$	91.50	Front carriage complete (21 place)	
30-501	.20	Decimal pointer	79, 82
30-502	.35	Dial cover	82
*30-503	1.00	Clear link assembly	Shown in MSB 126
*30-504	.45	Clearout link	Shown in MSB-126
30-505	.35	Assembly of register & total clearout fingers	79, 82
*30-505xl	.35	Assembly of register & total clearout fingers	
30-505-1/16	.35	Assembly of clearout fingers for half-cent dial	79
30-505-1/8xl	.40	Assembly of clearout fingers for 8th registering dial	79
30-506	.45	Assembly of clearout finger for 10-tooth counting dial	80
*30-506xl	.45	Assembly of clearout finger for 10-tooth counting dial	
30-506-1/16	.50	Assembly of clearout finger in half-cent dial space	80
*30-506-1/16xl	.50	Assembly of clearout fingers in half-cent dial space	
30-507	.50	Assembly of clearout fingers for 19-tooth counting dial	80
*30-507xl	.50	Assembly of clearout fingers for 19-tooth counting dial	

\*Not illustrated



Part Number	Price Each	Description	Shown on Plate Number
30-510 $\frac{1}{2}$	\$7.50	Carriage chassis	79
30-514 $\frac{1}{2}$	5.20	Assembly of front carriage cover case (without window frame) (shown as 30-514 $\frac{1}{4}$ )	79
*30-515 $\frac{1}{2}$	7.20	Carriage case with windows	
30-516x1	.30	Assembly of center plate for front carriage frame	79
30-516 $\frac{1}{2}$	6.50	Window frame without window strip	79
30-517	.25	Assembly of spacing plate for front carriage to left of half-cent dials	79
30-517 $\frac{1}{4}$	.25	Assembly of spacing plate for front carriage to right of half-cent dials	79
30-518x1	.30	Assembly of L.H. front carriage end plate with hinge rod hole	79
30-518 $\frac{1}{4}$ x1	.30	Assembly of R.H. front carriage end plate with hinge rod hole	79
30-519x1	.40	Assembly of L.H. end plate of front carriage	81
30-519 $\frac{1}{4}$ x1	.45	Assembly of R.H. end plate of front carriage	81
30-524	.65	Assembly of registering dial	80
30-524 $\frac{1}{4}$	.75	Assembly of half-cent registering dial	80
*30-524-1/16	.45	Dummy registering dial	
30-526	.30	Assembly of intermediate carriage gear	80, 83
30-526 $\frac{1}{4}$	.30	Assembly of last intermediate carriage gear	80, 83
30-534	.80	Assembly of 10-tooth counting & carrying dial	80
30-534 $\frac{1}{4}$	.80	Assembly of last 10-tooth counting dial	80
*30-560 $\frac{1}{2}$	2.10	Assembly of front carriage ledge	
30-590 $\frac{1}{2}$	115.00	Carriage complete with case (front)	79
30-603x1	.25	Assembly of locator arm	71, 74
30-604	.15	L.H. rear carriage lock guide bracket	72
30-604 $\frac{1}{4}$	.15	R.H. rear carriage lock guide bracket	72
30-605	.15	L.H. front carriage rest	69
30-605 $\frac{1}{4}$	.15	R.H. front carriage rest	69
30-606	.25	L.H. check spring support	70
30-607	.25	Front carry shaft adjusting blank	69
30-620	1.10	Driving crank gear	74
30-623	.40	Assembly of L.H. hinge rod bracket	72
*30-623 $\frac{1}{4}$	.25	Assembly of L.H. rear hinge rod bracket	
30-624	.40	Assembly of R.H. hinge rod bracket for front carriage	72
*30-624 $\frac{1}{4}$	.25	Assembly of R.H. rear hinge rod bracket	
30-627	.15	Adjustment nut for rear carry shaft	71
30-630	.65	Repeat & non-repeat key assembly	73
*30-630x1	.65	Repeat & non-repeat key assembly	
30-640	.40	Assembly of sub-frame for counting reverse mechanism	74
30-640 $\frac{1}{4}$	.50	Assembly of sub-plate for total reverse mechanism	74
30-650	.55	Assembly of front carriage lock lever	70
30-650 $\frac{1}{4}$	.45	Assembly of rear carriage lock lever	72
30-652	.55	Assembly of front carriage lock lever	70, 72
30-652 $\frac{1}{4}$	.45	Assembly of rear carriage lock lever	72
30-653	.70	L.H. rear carriage lift support	79

\*Not illustrated



Part Number	Price Each	Description	Shown on Plate Number
30-653x1	\$.70	L.H. rear carriage lift support	MSB-126
30-653 $\frac{1}{4}$	.70	R.H. rear carriage lift support	79
30-662 $\frac{1}{2}$	.95	Assembly of rear cross plate	68
30-663 $\frac{1}{2}$	.75	Assembly of strengthening channel for side frames	68
30-664 $\frac{1}{2}$	1.10	Assembly of front cross plate	68
30-710 $\frac{1}{2}$	1.15	Plus & minus rocker shaft	73
30-715 $\frac{1}{2}$	1.25	Assembly of main drive jack shaft	77
30-726	2.45	Planet arm, internal gear etc.	77
30-732	.30	Driving arm	69
30-763	.25	Assembly of hand cut-out lever	77
30-770 $\frac{1}{2}$	.55	Rock lever & connecting link	76
30-779	.25	Flexible end of over-carry trip lever	76
30-781	.60	Assembly of clutch yoke	77
30-781 $\frac{1}{4}$	.95	Assembly of clutch yoke operating arm	77
30-786	.30	Add key & toggle link	73
30-787	.25	Subtract key & toggle link	73
30-790 $\frac{1}{2}$	1.10	Assembly of motor bracket	68
30-794	35.00	Motor Assembly old style. See MSB-129 (Specify voltage)	78
30-794x2	27.50	Power Unit. See MSB-129 (Specify voltage)	MSB 127
30-795	.75	Regulating screw bracket	MSB 127
30-797	9.20	Start & stop switch	78
30-801	.75	Assembly of countershaft gears	74
30-801 $\frac{1}{4}$	1.35	Gears on clutch shaft for total reverse	74
30-802 $\frac{1}{2}$	.85	Assembly of gears on jack shaft	75
30-805x1	.25	Assembly of shift lever for counting dial reverse	74
30-805 $\frac{1}{4}$	.20	Assembly of shift bar for counting dial reverse	74
30-806x1	.35	Shift lever for totalizer dial reverse	74
30-806 $\frac{1}{4}$	.30	Assembly of shift bar for total reverse mechanism	74
30-813	.20	Assembly of counting finger	76
30-813 $\frac{1}{4}$	.20	Assembly of counting finger	76
30-820 $\frac{1}{2}$	.85	Assembly of operating arms to pivot rod for zero mechanism	68
30-821	.25	R.H. operating arm for zero keys	68
30-822	.25	L.H. operating arm for zero keys	68
30-1248	.50	Assembly of L.H. carriage lifter	68
30-1249	.60	Assembly of R.H. carriage lifter	68
30-1705	.45	Assembly of shifter for counting dial split clutch	81
30-1706	.35	Assembly of shifter for registering clearout shaft	81
*30-1716x1	8.60	Front carriage window frame	
*30-1716 $\frac{1}{2}$ x1	8.85	Front carriage window frame	
30-1734	.65	Assembly of 19-tooth counting dial	80
*32-100	11.55	Rear selecting shaft (17 place)	
32-100 $\frac{1}{2}$	13.75	Selecting gear shaft complete (rear)	71
33-100 $\frac{1}{2}$	13.00	Rear intermediate shaft (21 place)	70
*33-100 $\frac{1}{2}$ x2	13.00	Rear intermediate shaft (21 place)	
34-1 $\frac{1}{2}$	2.20	Rear carry shaft with gear and collar drilled and pinned	72
34-20	1.15	Assembly of gear on rear carry shaft	72
34-100 $\frac{1}{2}$	14.00	Assembly of rear carry shaft complete	72

\*Not illustrated



Part Number	Price Each	Description	Shown on Plate Number
35-1 $\frac{1}{4}$	\$.65	Hollow shaft and operating arm for counting clearout	81
35-1 $\frac{1}{2}$	1.65	Assembly of carriage jack shaft	81
*35-1 $\frac{1}{2}$ x1	1.65	Assembly of carriage jack shaft	
35-2	.40	Assembly of operating levers for 10-tooth counting dial clearout shaft	81
35-3	.80	Assembly of operating levers of registering dial clearout shaft	81
35-3 $\frac{1}{4}$	.50	Operating arm and shaft	81
35-4	.75	Assembly of operating levers for total dial	83
35-4 $\frac{1}{4}$	.45	Shaft and arm for total clearout	83
35-5 $\frac{1}{2}$	.45	Counting clearout shaft and arms	81
35-10 $\frac{1}{2}$	6.00	Rear carriage chassis	82
35-14 $\frac{1}{2}$	3.80	Rear carriage case without window frame (Shown as 35-14 $\frac{1}{4}$ )	82
35-16 $\frac{1}{2}$	3.75	Rear window frame without windows	82
35-20	.20	Rear carriage spacing plate left of split	82
35-20 $\frac{1}{4}$ x1	.20	Rear carriage spacing plate left of half-cent dial	82
35-21	.25	Assembly of L.H. end plate with hinge rod hole for rear carriage	82
35-21 $\frac{1}{4}$	.45	Assembly for R.H. end plate with hinge rod hole for rear carriage	82
35-22	.25	Assembly of L.H. rear carriage end plate (Shown as 3522)	83
35-22 $\frac{1}{4}$	.35	Assembly of R.H. rear carriage end plate	83
35-24	.65	Totalizer dial	82
35-24 $\frac{1}{4}$	.75	Assembly of half-cent totalizer dial	82
35-60 $\frac{1}{2}$	1.75	Assembly of rear carriage ledge	82, 83
35-60 $\frac{1}{2}$ x1	1.75	Assembly of rear carriage ledge	82, 83
*35-90	62.50	Rear carriage complete with case (17 place)	
35-90 $\frac{1}{2}$	65.00	Rear carriage complete with case (21 place)	82
35-505-1/16	.50	Assembly of clearout finger for rear carriage	82
35-505-1/8	.35	Clearout arm left of rear $\frac{1}{2}$ cent arm	MSB 126
35-1706	.35	Assembly of shifter for total dial clearout shaft	83
*35-1718x1	6.00	Rear carriage window frame	
*35-1718 $\frac{1}{2}$	6.00	Rear carriage window frame	
*37-100x1	45.00	Keyboard complete (17 place)	
37-100 $\frac{1}{2}$ x1	54.00	Keyboard complete (21 place)	75
37-110 $\frac{1}{2}$ x1	2.85	Assembly of top keyboard plate	75
37-600	7.50	Assembly of R.H. side frame	67
*37-600x2	7.50	Assembly of R.H. side frame	
37-610	7.75	Assembly of L.H. side frame	67
37-660 $\frac{1}{2}$ x1	18.90	Cover case complete	not shown
*37-661 $\frac{1}{2}$	3.00	Bottom pan (for 17 and 21 places)	
37-665	4.45	Assembly of L.H. side cover case	78
37-666	4.85	Assembly of R.H. side cover case	78
37-667 $\frac{1}{2}$	4.25	Front cover case	78
37-668 $\frac{1}{2}$	4.60	Rear cover case	78
37-670	1.25	Crank hole cover	78
37-671	1.90	Crank handle	78
37-777	.75	Assembly of over-carry trip lever	76
37-777 $\frac{1}{4}$	.45	Over-carry bell trip levers (rear)	70

\*Not illustrated